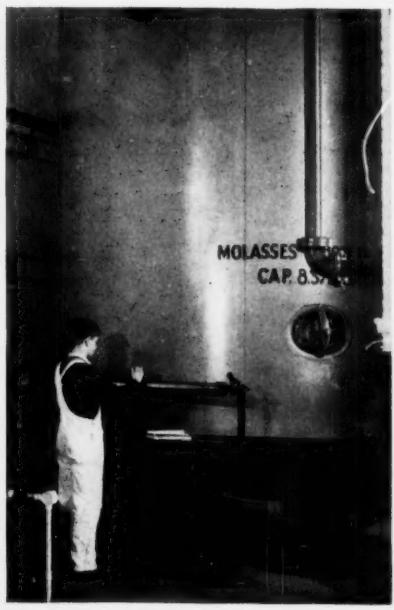


Chemical Week

January 19, 1952

Price 35 cents



It's "Chemical Additives Week"
in New York; Delaney probes,
MCA proposes p. 13

◆ **USPHS's Schwob;** his pollution
reports identify offenders; look
for an early crack-down p. 16

Now it's niacin, but further
uses loom as synthetic pyridines
gain foothold p. 31

Another \$1 million business:
agents to tie up metal ions; new
specialty uses spell growth. . . p. 39

◆ **Fermentation alcohol** price falls,
approaches that of synthetic—
and the gap may narrow more p. 59



Dan'l knew there's always a new frontier

And what he knew is characteristic of the chemical industry today. For instance, at Doe Run, Kentucky, on the Ohio, in the country Daniel Boone knew so well, Mathieson—for 60 years a leading producer of the nation's basic chemicals—now makes a pioneering contribution to the new field of petrochemistry. For the first time, cross-country pipelines are being employed to transport chemical raw materials from their source to the heart of industrial America.

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Chemical Week

Volume 70 Number 3
January 19, 1952

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AMERICAN POLYMER First in...Polymeric Resin Emulsions and Solutions

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Complete range of butadiene-styrene copolymers from 100% butadiene to 100% styrene . . . and metal ion resistant types . . . recommended for paper coatings, water paints, textile finishing, paper saturation, adhesive bases . . . Bulletin P-24, P-29.

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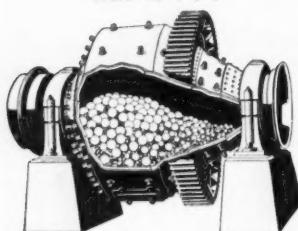


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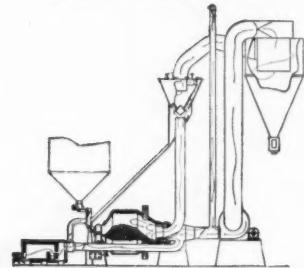
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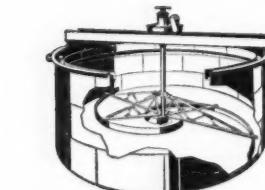
. . . BALL, PEBBLE AND ROD MILLS
(Conical, Tricone, Cylindrical). Write for Bulletin 17-B-36 (dry grind), AH-389-36 (wet grind), AH-414-36 (Tricone).



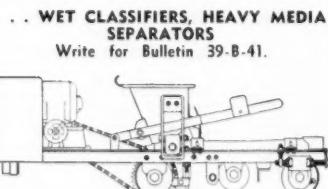
. . . ROTARY DRYERS, KILNS, COOLERS
Write for Bulletin 16-D-36.



. . . AIR CLASSIFYING SYSTEMS
Write for Bulletin 17-B-36.



. . . THICKENERS OR CLARIFIERS
Write for Bulletin 31-D-36.



. . . WET CLASSIFIERS, HEAVY MEDIA
SEPARATORS
Write for Bulletin 39-B-41.

. . . CONSTANT-WEIGHT FEEDERS
Write for Bulletin 33-D-36.

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O P I N I O N . . .

Silage Boost

To THE EDITOR: Congratulations on the excellent article entitled "Silage Saver" appearing in the December 29th issue of CHEMICAL WEEK. We think this is an excellent article and the most comprehensible one published to date.

We appreciate this article very much. We think you have described the situation just about as well as it can be done.

W. E. TILLER
Tennessee Corp.
Atlanta, Ga.

Hydroponic Debate

To THE EDITOR: I am afraid your usually efficient and skeptical staff went overboard for soilless culture "Hydroponics Harvest" (Dec. 1, '51). It contains many of the claims advanced by Sunday supplement writers for this method of growing plants.

The outstanding error is the claim that mature tomatoes can be picked in 70 days as compared with 160 days for ordinary culture. Actually, as Dr. S. H. Wittwer at Michigan State has so ably demonstrated, tomatoes take 60 days at average temperatures above 60 degrees from bud to harvest. There is nothing inherent in soilless culture which in any way changes the nature of the tomato plant. It is still a time-temperature proposition.

Comparisons made from averages for a given area with a specific operation are meaningless. (In fact they remind me of the time I proved statistically that the declining American birthrate was due to the increase in the sale of electric refrigerators.)

A familiar trick with hydroponics advocates is to quote per-square-foot production figures, using only the area of the tanks and ignoring the walks, aisles and other essential areas which should be included in acreage production figures to get a fair comparison. Actually, if tomatoes were grown in pure sand and given the same care and special attention given to tank-grown crops, the sand culture method would probably compare very favorably with the highly artificial hydroponic method.

In quoting the use of soilless culture by Air Force authorities during World War II in remote areas, you fail to tell why this was necessary. On many remote Pacific islands, there is no soil as such, or water is so scarce as to make its conservation a major consideration, or high salt content makes existing soils incapable of supporting

normal plant life. I am certain that no military man in his right mind would have gone to hydroponic culture if good soil had been available, when the expenditure of manpower for that method is many times as high as for growing plants in field culture.

For a more accurate appraisal of the real role of growing plants under hydroponic culture, I would recommend that you consult . . . Dr. S. L. Emsweller, Chief Horticulturist in Ornamental Crops, Bureau of Plant Industry, Beltsville, Md., and Dr. R. B. Withrow, of the Carnegie Institution, Washington, D. C.

Dr. Emsweller has grown a number of greenhouse crops in gravel culture, for reasons other than spectacular production, and can evaluate its advantages and disadvantages. Dr. Withrow, who I believe was the key man in setting up the Air Force installations during World War II, was one of the pioneers in gravel culture when at Purdue . . .

R. MILTON CARLETON
Research Director
Vaughan's Seed Co.
Chicago, Ill.

To THE EDITOR: The fine article, "Hydroponic Harvest", which appeared in the December 1, 1951, issue of CHEMICAL WEEK . . . very vividly describes the growth of the hydroponic industry, and we are pleased to have played a part in this remarkable growth.

While our product, Hyponex, is also widely used in soil culture of plants, it was originally developed for use in hydroponics and is extensively used for that purpose.

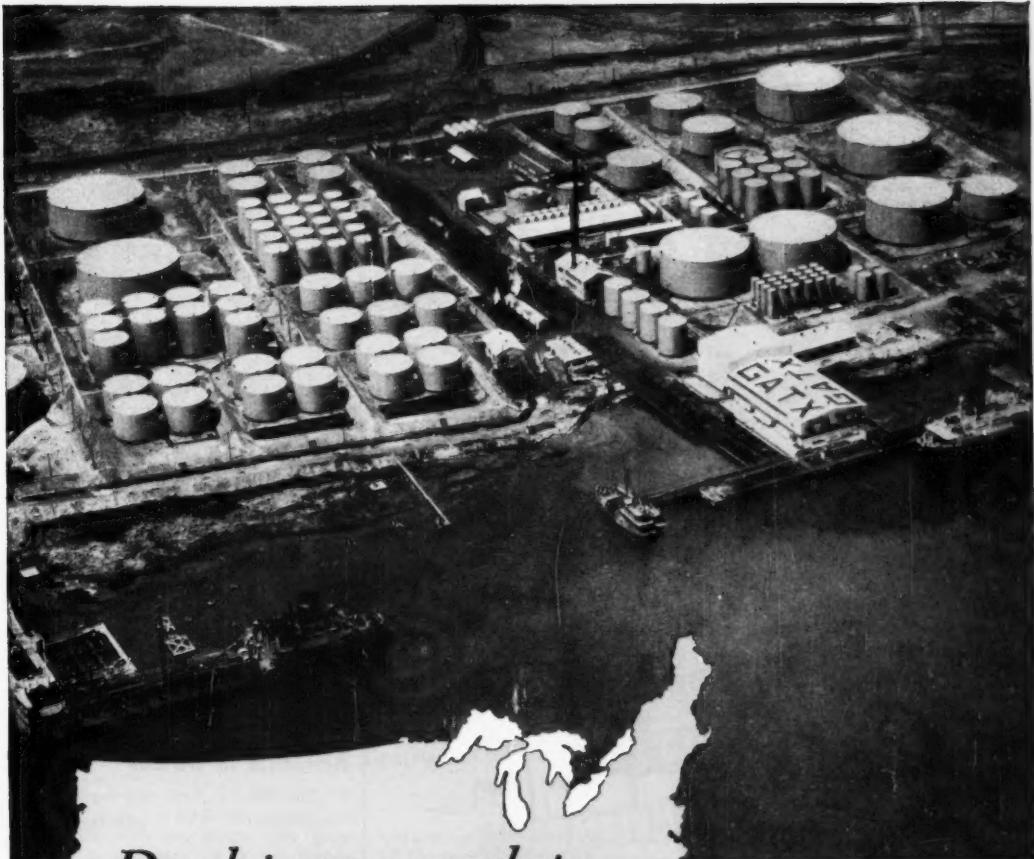
C. A. DOERING
Hydroponic Chemical Co.
Copley, Ohio

CW checked its story with many in the field, concedes that disagreement exists—as it does indeed on the practicability of solar energy, synthetic fuels, and a host of other relatively radical ideas.—ED.

News to Signal Corps

To THE EDITOR: In your issue of December 8th you refer to a report by the Army Signal Corps to the effect that a new dry battery utilizes a low-grade domestic manganese dioxide ore instead of imported manganese dioxide (apparently African battery-grade ore). The reported result is that the new battery costs little more than the old . . . lasts twice as long.

To those of us who are directly in-



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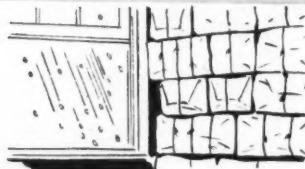
NO. 1 OF A SERIES ON HOW TO Stretch a MULTIWALL Paper Bag

Kraft paper supplies are short. So it is important for you to get the best use from your multiwalls. Here is one way to stretch them . . .

PROPER STORAGE OF EMPTY BAGS



3. Drill small "needle" holes in horizontal water pipes. Hang cloths over holes. Air absorbs moisture from wet cloths.



5. Open windows on damp or rainy day. Damp outside air will circulate in the bag storage room. Multiwalls are strongest when moisture content of the paper is about 6 or 7%.



6. Use commercial humidifying apparatus. Many types of commercial humidifiers are available with capacities to suit individual requirements.



1. Let steam escape in bag storage room to keep air and bags humid. Keep a humidity indicator in the storage room and check it frequently. Always leave aisles or spaces between stacks of bags to allow circulation.



2. Store bags on Dunnage, away from floor, and keep floor wet so moisture can be absorbed into air. A relative humidity of about 50% at warm temperature is best.



4. Hang wet cloths over edge of water barrels. Cloth absorbs water and air absorbs moisture from cloth. Keep barrels well filled.

Want the Whole Story?

Ask your Bemis Man for free, illustrated copy of Bemis Multiwall Packaging Guide. It deals with Storage, Filling and Closing, Handling, Palletizing and other important subjects.

* * *

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Bemis



St. Louis 2, Missouri

terested in the making of dry cells and who are familiar with this development, the above report is not in accord with the facts. It gives the reader the impression that the low-grade ore is used directly in the cells, whereas the fact is that a certain low-grade domestic ore is now the raw material used in the production of electrolytic manganese dioxide, which is used in the cells. . . .

However, at least three dry cell manufacturers have been making such electrolytic manganese dioxide for over ten years. Its use by them made possible the powerful dry batteries that contributed so much to the success of the "walkie-talkie" . . . in World War II. . . . The "new" battery has been produced and sold to the general public for over ten years.

O. W. STOREY
Chicago, Ill.

The Signal Corps says its use of low-grade domestic manganese is new; its development has been reported in the press on and off during the past year. What is currently newsworthy is the Signal Corps' announcement last November that the battery has passed all tests and is ready for commercial production. That means a large new market.—ED.

Accurate in Details

TO THE EDITOR: Your write-up in the December 29th issue . . . of the packaged unit which our company furnished for S. F. Lawrason & Co.'s plant in London, Ontario, was accurate in details and well captioned.

JAMES P. O'DONNELL
Engineer
New York, N. Y.

Holiday Goodwill

TO THE EDITOR: I have just read the December 29th issue of CHEMICAL WEEK and I wish to compliment you and your staff on an excellent issue. There were many newsworthy articles and all were written in a fashion pleasing to me.

J. CONWAY
Carbide and Carbon Chemicals Co.
New York, N. Y.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 18, N. Y.

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NEWSLETTER

The number of purely inorganic chemical firms is rapidly dwindling. Latest defection from the thinning ranks is Solvay Process Division, which has formalized its long-time interest in organics (detergents, succinic derivatives) by creating an Organic Section.

It's plunging in neck-deep. First move is a \$5 million ethylene glycol and ethylene oxide plant near Orange, Texas, completion of which is expected within two years. Ethylene will be supplied by pipeline from Port Arthur, Texas—presumably from Gulf's huge new ethylene plant.

Texas is also the site of another new operation—this one already on stream: Texas Eastman's plant at Longview.

Producing n-butyraldehyde and isobutyraldehyde via the Oxo synthesis (propylene, carbon monoxide, hydrogen) and ethyl alcohol from ethylene, the plant is already taking a third of its eventual (80,000 gal. per day) propane consumption, and two-fifths of its final (10 million cu. ft. per day) natural gas requirements, both from Humble Oil.

Still another project—this time in the Delaware River industrial area—will get under way immediately for completion next year: Hercules Powder Co.'s \$8 million phenol-from-cumene plant.

This, like Solvay's step, represents a radical shift in company policy; for it adds coal tar products to Hercules' traditional fields of cellulose and naval stores derivatives.

The new facilities will produce phenol and acetone from benzene, para-cresol and cymene alcohols from the terpene hydrocarbon, para-cymene—available from Hercules' naval stores plants in the South.

One logical reason for the location: proximity to the coke ovens of U. S. Steel's new steel plant at Morrisville, Pa.

The third phase of Celanese Corp.'s huge (\$155 million) expansion in Canada will get under way soon, when Celgar Development Co., an affiliate, starts work on a \$65 million wood pulp and newsprint program in southeastern British Columbia. Two—and possibly four—new mills are envisioned.

A cellulose mill—phase two—has already been completed by the subsidiary Columbia Cellulose Co. at Prince Rupert, and a petrochemical and cellulose acetate plant—phase one—is now being built at Edmonton by Canadian Chemical Co., another affiliated concern.

All of these programs will bulk pretty small against the \$6 to \$10 billion atomic plant expansion in the cards for AEC.

Henry M. Jackson, Congressional Representative from Everett, Wash., and a member of the Joint Congressional Committee on Atomic Energy, predicts that Congress will authorize the funds early this year.

If it goes through, it will mean a lot to Jackson's home state. The program will take four years to complete, and it will add considerably to the 8,000 construction workers at Hanford Works, near Richland, Wash.

NEWSLETTER

Another 50 million lbs. a year of polyethylene is on its way. Carbide and Carbon is starting to build a unit at Texas City, hopes to complete it early next year. DPA has granted a rapid write-off.

The new unit will provide a sizable boost over current capacity. Carbide estimates that its and Du Pont's output will add up to 100-150 million lbs. a year by the end of 1952.

The latest list of certificates of necessity, issued this week by DPA, includes a respectable number of chemical items:

- Sulfuric acid: Humble Oil, \$588,000 (70%); Consolidated Chemical Industries, \$3 million (70%); Anaconda Copper, \$1,550,000 (70%); Pure Oil, \$2,478,000 (90%) and \$32,000 (40%).
- Formaldehyde: Heyden, Fords, N.J., \$280,000 (50%).
- Coal tar chemicals: Allied Chemical, Chicago, \$10,650,000 (60%).
- Synthetic glycerine: Shell Chemical, Houston, \$1,514,000 (various percentages).
- Higher alcohols: Esso Standard, Baton Rouge, \$2,750,000 (70%) and \$240,000 (50%).
- Naphthalene: Koppers, Chicago, \$196,000 (60%).

Certificates may come a little easier for chemical projects as a result of DPA's revision this week of its priorities schedule.

The list now stands as follows: (1) machine tools; (2) ferrous and nonferrous ores; (3) pig iron; (4) cryolite, bauxite, pig aluminum; (5) ferro-alloys; (6) selected refractories; (7) sulfur; (8) aviation gasoline; (9) ferrous and nonferrous scrap; (10) selected aluminum and magnesium extrusions; (11) chemicals; (12) transportation facilities; (13) electric power; and (14) products essential to military programs.

Chemicals, in the eleventh spot, are (along with items 5, 12 and 13) new on the list. Among the chemicals with a "standing": aniline, benzene, fluorinated hydrocarbon polymers, hydrazine, hydrofluoric acid, hydrogen peroxide, naphthalene, nitrogen, oxygen, para-chlorophenol, penicillin, phenol, polyethylene, phthalic anhydride, quinoline, silicones, sodium cyanide, sulfuric acid, Thiokol, titanium dioxide, and yellow oxide.

Aiding NPA in its chemical programming is a corps of 41 industry advisory committees, established during the past year. The agency is gratified, Assistant Administrator G. Lyle Belsley told CHEMICAL WEEK, with the cooperation of the 469 chemical executives who have served or are serving as consultants to NPA.

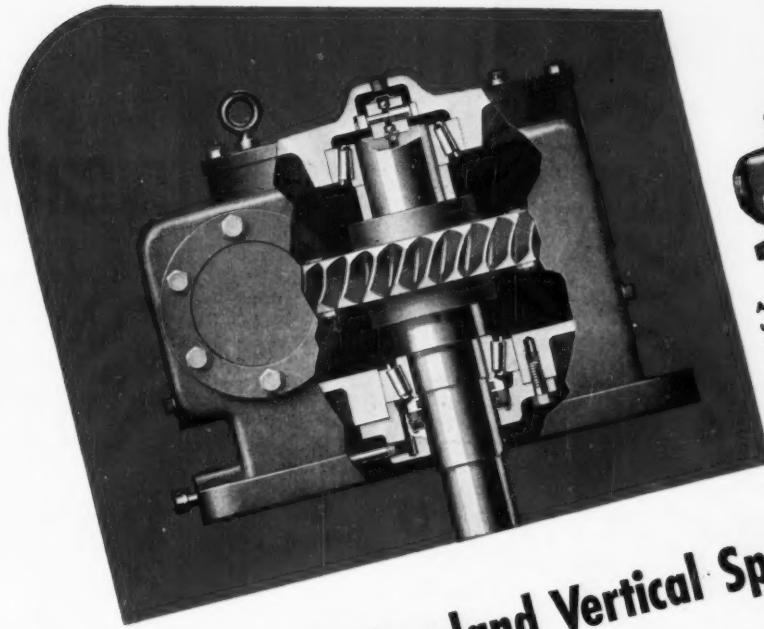
While the U.S. chemical industry has burgeoned mightily during the past decade, our northern neighbors haven't lagged:

Sales of the Canadian industry quadrupled between 1939 and 1950—from \$160 million to \$636 million; and the estimate for 1951 is \$750 million. Total industry tripled during the same period, so chemicals were a pace-setter.

A whale of a pituitary gland—that's what Antarctic whales have to contribute to makers of ACTH, anti-arthritis hormone, derived in this country mainly from pig glands.

New Oslo's Nyegaard & Co. has donated \$50,000 worth of whale ACTH to Norwegian hospitals for research, believes it can make a purer, more potent product from the bigger glands.

... The Editors



Above—Exterior view Type ND unit. NU unit (not shown) has slow-speed shaft extending up.

At left—Cutaway section to show tapered roller bearings on gear shaft, positive face-type oil seal, unique lubricating pump and oil drain at base of housing.

A new series of Cleveland Vertical Speed Reducers

- NU and ND worm gear units—in seven sizes each (50 to 500) are ready for prompt delivery. They are particularly suited to such equipment as agitators and mixers, and to overhead chain conveyors as well.

Outstanding features which insure that these new vertical drives will deliver long and trouble-free service are:

Extra heavy tapered roller bearings on gear shaft. Continuous lubrication of top bearing on positively driven pump mounted on upper end of gear shaft (on lower end in Type NU).

Positive face-type oil seal below lower gear shaft bearing to prevent leakage.

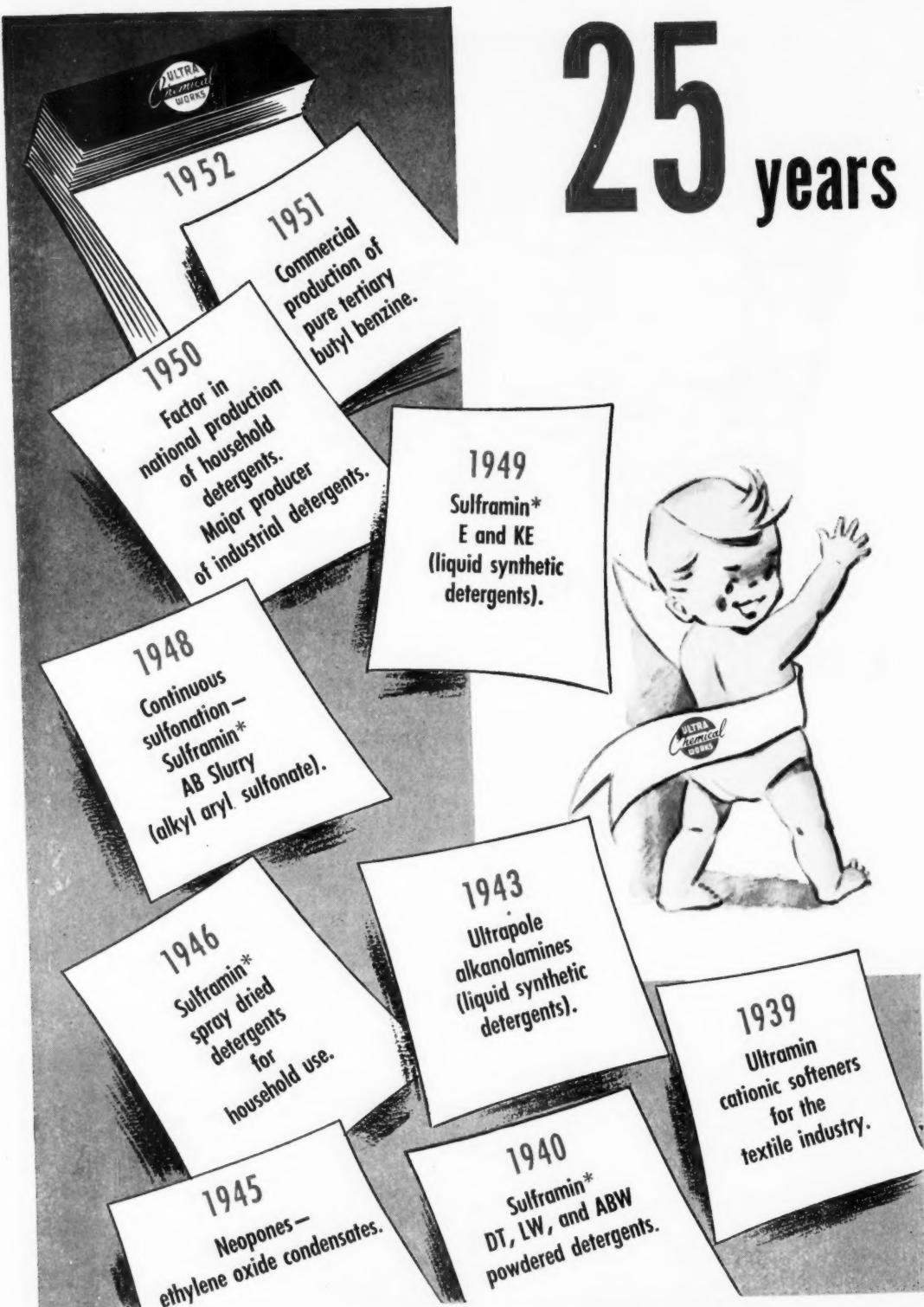
Heavy base flange extends around all four sides. All parts liberally sized and precision built.

Write for Bulletin 123 for full description of Types NU and ND, including capacity charts and dimension data. The Cleveland Worm & Gear Co., 3291 East 80th Street, Cleveland 4, Ohio.

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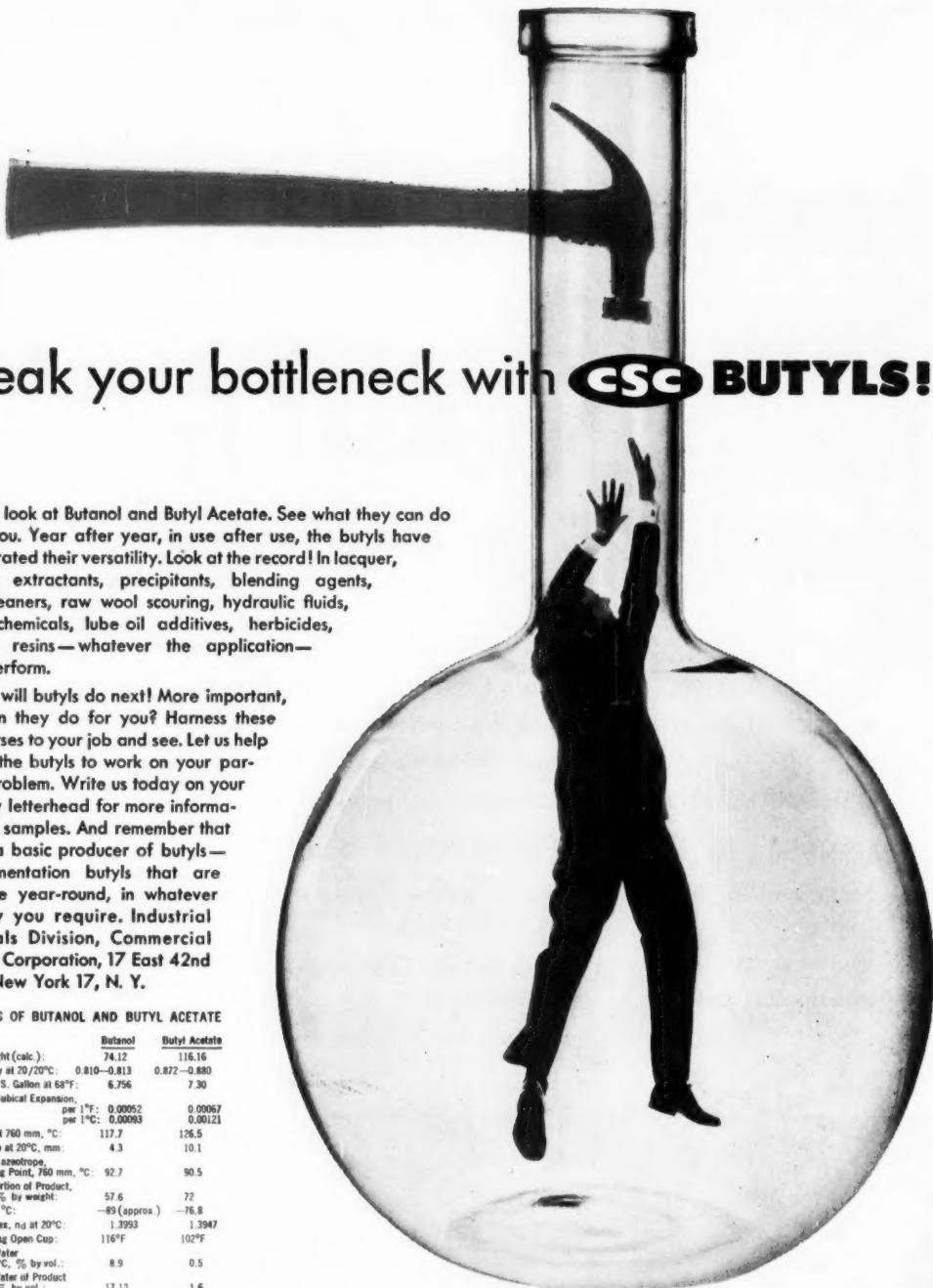
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PROPERTIES OF BUTANOL AND BUTYL ACETATE

	Butanol	Butyl Acetate
Molecular Weight (calc.):	74.12	116.16
Specific Gravity at 20/20°C.:	0.810-0.813	0.872-0.880
Pounds per U. S. Gallon at 68°F.:	6.756	7.30
Coefficient of Cubical Expansion: per 1°F.: 0.00052 per 1°C.: 0.00093	0.00067 0.00121	
Boiling Point at 760 mm., °C.:	117.7	126.5
Vapor Pressure at 20°C., mm.:	4.3	10.1
Product-Water azeotrope, Boiling Point, 760 mm., °C.:	92.7	90.5
Proportion of Product, % by weight:	57.6	72
Melting Point, °C.:	-89 (approx.)	-76.8
Refractive Index, nd at 20°C.:	1.3993	1.3947
Flash Point, Tag Open Cup:	116°F	102°F
Solubility in Water, at 25°C., % by vol.:	8.9	0.5
Solubility in Water of Product at 25°C., % by vol.:	17.12	1.6



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BUSINESS & INDUSTRY . . .



DELANEY COMMITTEE: Cosmetics were their target.

Additives Double-Header

The chemicals-in-foods-and-cosmetics arguments reached a climax in New York last week. The Delaney Committee, FDA Commissioner Crawford and the MCA all added fuel to the fire.

Delaney's Committee was taking testimony on cosmetics; MCA members were hearing legislative recommendations from FDA's Crawford and MCA's own legislative proposals.

MCA now officially advocates notification-and-veto procedure for new additives, feels present laws otherwise adequate.

New York, in the throes of a damp and dreary winter, was far from dull for chemical manufacturers this week: The mold for government legislation under which they will have to operate was in its design stages.

From the tone of testimony before the Delaney committee on the subject of cosmetic ingredients, tightening of regulations seems a good possibility.

And from the tone of talk at MCA's inter-industry conference on chemicals in foods, back-tracking from onerous regulations, which had been proposed earlier, seems in the wind.

Chemical Viewpoint: The real news of the week was the unveiling of MCA's own legislative proposals. The association crystallized 18 months' study of the whole chemical additives question by advocating a single

change in present laws: manufacturer or processor must notify the FDA 60 days before introducing any new chemical into foods. The notification would include the chemical composition of the additive, concentration at which it would be used, and a report of all tests for acute or chronic toxicity which had been made.

FDA, if it were doubtful about the material, could ask the manufacturer to discuss the properties of the additive, and—if it considered it necessary—could ban its use. MCA considers this all that is requisite, since FDA now has the power to regulate additives once they have been put on the market.

As it is now, most manufacturers voluntarily notify the FDA before using a new additive; so for them, the law would mean little change. The

difference would affect the unscrupulous fringe of industry, which, in the main, has been responsible for the attacks on chemical manufacturers and food processors in general.

Mellowing Outlook: The viewpoint of the FDA, which will have to enforce whatever legislation there is, seems to have changed for the better. The Miller bill (H.R.3257) is not as popular as it once was; FDA Commissioner Charles Crawford seems less sold on the cumbersome registry-and-approval routine for allowing chemical additive use than he used to be.

One reason for this is the realization—fostered both by manufacturers themselves and by industry-wide programs like MCA's—that neither the food nor chemical industry is interested in complying with just the letter of the law.

Much of the credit for MCA's lucid explanation of the industry viewpoint belongs to its chemicals in foods committee, under Dow's Howard Spencer, which comprehensively examined both the technical and legal aspects of food protection.

Delaney's Doings: While the industry could be proud of its end of the events, it might view with concern some of the testimony before the congressional committee.

Those who took their turns in the green-leather witness chair in room 128 of the U.S. Court House were divided between cosmetic industry men and dermatologists.

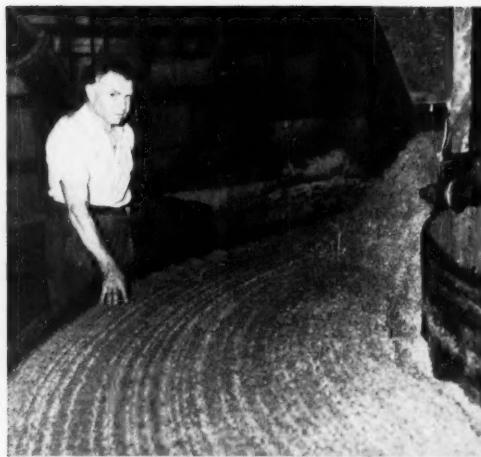
There was a definite gulf between recommendations of the professional practitioners and the industry men:

- On testing ingredients, industry pointed to its present practices, which it felt were as good as they could be if any progress were to be made. Dermatologists asked for standards requiring more extensive testing.*

- On new ingredients, dermatologists recommended that they be registered, as drugs now are. They also asked for labeling of ingredients.

But while there was a disagreement on some issues, many of the professional men emphasized that in general, the big cosmetic manufacturers conduct extensive tests; it is the smaller manufacturer who will be harder hit by new restrictions.

* An exception: Dermatologist M. H. Sulzberger, despite intense cross questioning, stuck to his point that today's estrogenic face creams are harmless.



Boosting Europe's Chemical Output

HARD HIT by the war, Europe's chemical industry has been helped back on its feet by \$250 million worth of American chemicals, mostly raw materials, imported with Marshall Plan help since 1948.

Typical of ECA assistance: \$367,000 worth of insecticides sent to France (left: model farm at St. Pathus using American-made spraying machine as well); and \$4 million toward a \$125 million modernization and ex-

pansion of potash mines in French Alsace (right), Western Europe's most important source of that chemical commodity.

Today, with expansion of its chemical industry and the allied oil refining industry, Europe is becoming gradually independent of U.S. imports.

Relief or Punishment?

Lawyers for Du Pont are asking whether the Government is out to relieve the situation for which Du Pont, ICI, and Remington were convicted of anti-trust violation, or to punish the companies.

Down in Federal District Court in Foley Square, New York, where the opponents in the Government's successful anti-trust prosecution are now presenting their proposed decrees, the lawyers for the convicted defendants claim to see no possible reason for the Government's harsh demands—other than a desire to punish.

Both sides are essentially agreed on the necessity of dissolving all direct ties, agreements, and activities between Du Pont and ICI whereby the two companies divided the world into exclusive areas of non-competition and effectively restrained trade. But horns are locked on the disposition of the various joint companies created by Du Pont and ICI in non-exclusive areas (specifically Canada and South America), and over the fate of the many patents involved.

Joint Companies: On the joint companies, the Government, in the dynamic personality of Special Assistant U.S. Attorney General Leonard Emerglick, is asking, plainly and simply, complete and immediate divestiture.

He isn't concerned how this can be done, but offers four acceptable alternatives:

- Both ICI and Du Pont sell their holdings to non-conspirators.
- Either ICI or Du Pont sell to a non-conspirator.
- Either ICI or Du Pont sell to the other.
- Break the company's holdings into two segregated groups, each to be initially owned by one defendant.

In answer to this, the companies claim to see no reason why divestiture should be ordered on the basis of the facts of the case. They were convicted, they maintain, in matters of world commerce and export and import. It is therefore sufficient to make certain that ICI's and Du Pont's exports and imports are in competition with each other and with the joint companies' products in areas where joint companies operate.

With this view of the facts in the case, the companies propose that the joint companies no longer be employed to sell or distribute the parent companies' products; that the parent companies no longer act as agents in the U.S. for the joint companies; that no restrictions be made on the rights of the joint companies to sell in the U.S. market in competition with Du

Pont; and that the parent companies shall not refer any inquiry or purchase order to the joint companies.

In the case of ICI and the South American companies, ICI claims that the U.S. court has no right to interfere with the sale and distribution of wholly British-made products by the joint companies there. In this, ICI and Du Pont differ; at least in their proposed decrees.

In general, the companies' provisions are intended to "terminate and preclude the revival of any agreement or understanding between defendants to eliminate competition in any foreign country through the instrumentality of any joint company and to dissipate the effects of the restraints on United States trade and commerce found to exist therefrom."

Patents and Technology: It is in the section of the proposed decree involving patents and technology that the Government is most demanding—and out on the shakiest limb. What the Government wants is compulsory licensing of "all of its (ICI, Du Pont, and Remington) existing and future patents, unrestricted except that a reasonable non-discriminatory royalty may be charged." For the 300 odd nylon patents, the Government wants the same compulsory licensing but royalty-free.

While this is enough to set Du Pont

BUSINESS & INDUSTRY

and ICI lawyers frothing, the next Government demand has them all but speechless. This is the by-now famous "manuals" provision. Under this proposed section of the decree, Du Pont would be required to produce manuals covering all of its present or future patents under the judgment, describing the methods and processes "used and usable", and supply them to any licensee. Moreover they would have to be revised at least every year. This would go on for five years, on a "reasonable" payment basis.

But there is even more. In the case of the nylon patents, the period of production will be eight years, and in addition to the manuals, copies of blueprints, drawings, and designs for plants and machinery in the plants would have to be provided "at cost."

To back up these demands the Government cited two principal arguments: The first is that, although the case is primarily one of foreign division of markets, Du Pont, by virtue of its agreements with ICI, was forced to deny other American manufacturers its processes in order to insure that they did not export and compete with ICI.

The Government's second argument involves the doctrine of "fruits," in which it is enunciated that a defendant must be deprived of the "fruits of his conspiracy." In applying this doctrine the Government claims that all Du Pont's patents are "fruits" of "fifty years of conspiracy."

Not Even Involved: Du Pont lawyers answer by flatly denying that the patents, except as they affect foreign trade, are even involved in the case. No finding in the judgment against them had any reference to United States patents or technology, they claim.

Even if they were, says Du Pont, they are not legally "fruits," nor can the Government prove that the chemical industry has been in any way impoverished by Du Pont's failing to license patents, as is claimed.

On this basis, the companies propose two major decrees—only one affecting ICI. First, for fifteen years Du Pont shall not enforce its patents, here or abroad, to prevent imports into this country or exports to other countries, and shall grant no rights that would enable the grantee to do the same. Second, for a period of five years neither ICI or Du Pont will grant or receive any patent from the other, without the court's permission.

Accent On Foreign: Throughout the pleading on the decrees the companies have emphasized the foreign trade nature of the case to counteract

the Government's demands for domestic relief—apparently with some success. It appears plain at this point that the Government is going to have a hard time convincing Judge Sylvester Ryan that compulsory licensing is necessary, much less royalty-free licensing. As for the manuals, the Judge has already expressed the opin-

ion that they appear a little "broad" as relief.

But in the area of the joint companies it is Du Pont and ICI who appear to be on the defensive. The Judge has made it plain that a certain amount of divestiture seems inevitable if competitive conditions are to be created.

Who to See in Washington

The National Production Authority, taking heed of past complaints, has centered the administration of each of its many orders with one specific official.

Here, tabulated chronologically, is a list of the persons to see concerning each directive. Except where noted, offices are located in the new GAO building. Mail address is Washington 25, D.C., phone STerling 5200.

These are the divisions

Chemical division (CD), rubber division (RD), pulp, paper and paper board division (PPPBD), and container and packaging division (CPD) of

the Chemical, Rubber and Forest Products Bureau.

Tin, lead and zinc division (TLZD), aluminum and magnesium division (AMD), and miscellaneous metal and mineral division (MMMD) of the Metals and Minerals Bureau.

Production evaluation division (PED), priorities and directives division (PDD), and Canadian division (CanD) of the Policy Coordination Bureau.

Scientific and technical equipment division (STED) of the Textile, Leather and Specialty Equipment Bureau.

ORDER	ADMINISTRATOR	LOCATION	PHONE*	DIVISION†
M-2 (rubber)	E. D. Kelly	2-X-1	3134	RD
M-19 (cadmium)	Mrs. Margaret B. Murphy	2-G-2	3015	TLZD
M-25 (cans)	R. J. Small	2-W-6	5800	CPD
M-26 (packaging closures)	H. B. Esselen	2-X-5	5811	"
M-31 (chlorine)	Vernon Clark	2-Y-12	4360	CD
M-32 (DO limits)	No assigned individual			"
M-45 (allocations)				
S-1 (naphthenic acid)	L. A. Schlueter	2-V-15	5033	"
S-2 (polytetrafluoroethylene)	G. H. Sollenberger	2-W-12	5917	"
S-3 (sulfuric)	schedule revoked			
S-4 (nylon plastic)	G. H. Sollenberger	2-W-12	5917	"
S-5 (polyethylene)	Edward Smith	2-W-12	5917	"
S-6 (resorcinol)	Bernard B. Langton	2-V-12	5029	"
S-7 (sebacic acid)	Frank E. Bennett	2-V-16	3424	"
S-8 (methyl chloride)	W. W. Davidson	2-V-15	4620	"
S-9 (methylene chloride)	W. W. Davidson	2-V-15	4620	"
S-10 (Thiokol)	L. B. Kilgore	2-V-16	5919	"
M-48 (bismuth)	A. J. Cavanaugh	2-H-1	3370	TLZD
M-51 (glass containers)	H. B. Esselen	2-X-5	5811	CPD
M-66 (graphite and carbon electrodes)	Atwood B. Oatman	2-I-3	5641	MMMD
M-67 (conv. aluminum foil)	Glenn E. Carter	2-U-6	3580	CPD
M-69 (sulfur)	John F. Wood	2-Y-10	3637	CD
M-71 (lab priorities)	William Thompson	2245 ¹	5380	STED
M-72 (chem. wood pulp)	A. Murray Howe	2-T-7	5150	PPPB
M-75 (steel drums)	C. J. Lanigan	2-T-5	3949	CPD
M-84 (aluminum for destructive use)	John C. West	2-K-4	5515	"
NPA Reg. 1 (inventory control)	Nathan B. Salant	2-U-8	6613	PED
NPA Reg. 2 (priorities)	W. C. Groce	235 ²	5101	PDD
NPA Reg. 3 (Canadian priorities)	W. J. Zepp	2-T-15	4521	CanD

* All listings are extensions of ST-5200.

† Full names identified in story.

¹ Temporary building "T."

² Old GAO building.

Pollution Abaters Crack Down

Although it isn't making headlines, the Federal water pollution abatement fight is continuing. In an exclusive interview last week, Carl E. Schwob, chief of the Division of Water Pollution Control, U.S. Public Health Service, told *Chemical Week* that Federal efforts to abate pollution of the nation's streams will proceed from mere fact-finding and fact-gathering to the "practical" this year. Kick-off for the enforcement program will be the publication some time in February of the last of 15 proposed "summary reports" detailing conditions in the major river basins. Ten reports have already been released.

In these summary reports, prepared cooperatively by the Federal Government and state agencies, the U.S. Public Health Service has been laying the groundwork for the "action" program. The agency is charged with carrying out the provisions of the Water Pollution Control Act of 1948. Preparation of the reports is part of the comprehensive program called for by this law.

The summary reports identify the problem—i.e., point out where the pollution is and who is responsible. The reports name the cities and the firms.

Under the law the states get the first opportunity to solve the problem. If they do not, then the Federal Government starts hearings, makes recommendations, finally takes the case to court.

Serving Notice: The reports are more important than may at first appear. They are not merely Government technical documents: They are an unofficial . . . It would thus be prudent for any municipality or industrial firm named in any report as having no treatment of its sewage or industrial waste, to do something about it.

Carl Schwob said that, as a matter of information, each city or firm named in any of the reports is sent a copy of the one in which it was mentioned.

Last week (Jan. 7) the Federal agency published the report on the industrially-important North Atlantic drainage basins. It covers part of the Great Lakes and the rivers in New York, New Jersey, Delaware, and most of Pennsylvania and Maryland.

Sewage treatment facilities needed in this area at 724 municipal and 880 industrial locations are estimated to cost a minimum of \$1 billion. Because of increasing costs, and as all of the



"Ounces of prevention are worth pounds of cure . . ."

information becomes available on the control problem, the cost may approach \$2 billion.

The study included an economic survey as well. It shows that in the area were 29.5% of the chemical and allied products establishments of the U.S., employing 34.4% of the workers in this industry. Also in this area are 50.4% of the textile products establishments, and 38.6% of plants making paper and allied products.

Damage to water resources from these establishments has been rather extensive. Some of the most polluted areas were found in the waterways of the greater New York metropolitan area.

Pollution Controller Schwob said that in some areas (such as the North Branch of the Potomac River) acid mine drainage plus industrial and sanitary wastes have so damaged the water quality that these waters hardly respond to standard treatment methods for industrial purposes.

About 1,800 industrial plants not connected to municipal sewer systems are actual or potential sources of pollution, the report states. Treatment works are provided for only 60% of the municipal sewer systems, and for only about 24% of the total number of industrial sources listed.

Many Plants Needed: The report points out that new treatment plants are needed to serve 439 municipal sources of pollution and 683 industrial sources, and enlargements and additions to existing facilities are needed for 224 municipalities and 184 industrial plants. It shows that treatment facilities serving 61 municipalities and 13 industries should be replaced.

Pollution control chief Schwob and his staff say that over the entire country the pollution picture is not



CARL E. SCHWOB: "Progress . . . is disappointing."

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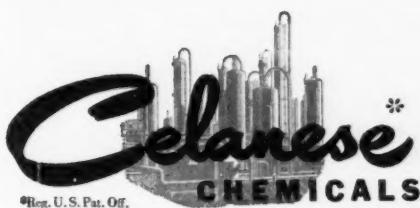
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good. When all the 15 reports are published they will show that there are 22,000 significant sources of pollution in the U.S. nearly equally divided between 11,800 municipal and 10,400 industrial culprits. Of the industrial establishments contributing to the pollution load, about 6,000 produce organic wastes, over 2,500 produce inorganic wastes, and 600 or more produce both types. Data on kinds of wastes produced will still be needed for over 2,000 plants.

Government officials and experts realized that there would be much missing information. The agency therefore divided the development of control into two distinct phases: development of reports which would provide basic data and reference points for measuring progress; and enforcement according to the law. This is the next step. Action will begin this year.

Schwob told *CHEMICAL WEEK* that data and knowledge now available are sufficient to permit the immediate solution of many of the pollution problems within every basin without awaiting the results of additional surveys and studies.

"Progress in pollution abatement during the postwar period is disappointing when viewed solely in relation to construction completed during the years 1946 to 1949," he said.

But he quickly added that it must be remembered that the materials and labor shortage during the immediate postwar period stymied construction of this type. Then later, when it picked up speed, the Korean war stopped it again.

Since the war a total of over 500 industrial waste treatment plants have been built. Forty-four were built in 1946, 97 in 1947, 175 in 1948, and 201 in 1949. The total for 1950 will probably be just as high as, if not higher than 1949, despite the cutbacks in the second half of that year.

Ounce of Prevention: Schwob and his staff put much emphasis on pollution prevention at the source. He believes that by studying their operations closely, many more plants can develop "good housekeeping" practices which will avoid wastes that are now added to the pollution load of the nation's rivers.

"These ounces of prevention are worth many pounds of cure that would otherwise be required in the form of waste treatment and disposal," he pointed out.

The Federal law does not authorize any direct financial aid to help industry abate pollution. Some help comes through technical assistance



"Clean water is not just for fishing . . ."

that the Federal Government is permitted to render on special problems. A national technical task committee on industrial wastes was organized in May 1950 at the suggestion of Surgeon General Leonard A. Scheele, head of the Public Health Service. Special industry groups from that committee are at work.

Officials at the Public Health Service say that the current mobilization period is repeating conditions of World War II. Industry is again expanding, building new plants; and sewage treatment works construction is slowing down. "As far as treatment works construction is concerned," says Schwob, "I believe that project needs should be pin-pointed in areas where new industries are coming in or where industries are expanding. If materials are to be scarce, it is important to use them where they will do the most good."

Fishing Not All: What about industry?

"Industry has its job to do in this program. Clean water is not just for fishing and bathing. It is a vital raw material and industrial facility. From its own standpoint it is a matter of good business and good citizenship not only for industry to do its part for pollution abatement, but also to spread the word that clean water is an important national asset," he asserted.

During the next few weeks Schwob and other Public Health Service officials will appear before appropriations committees to justify their budget requests for fiscal year 1953. They feel that, particularly because of the data contained in the 15 summary reports, Congress will give them the money to move ahead on the proposed action program.

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EXPANSION . . .

Ammonia and Methanol: Commercial Solvents Corp. has awarded contracts for an ammonia and methanol expansion at Sterlington, La., to Ford, Bacon and Davis Construction Corp., Monroe, La. The construction, cost of which is estimated at \$20 million, will double the plant's present production. Completion of the work is slated for January, 1953.

Alumina: Reynolds Metals Co., looking forward to completely integrated aluminum production facilities, is about to contract for a \$42 million alumina processing plant to adjoin the metallic aluminum facilities now being built in Texas' San Patricio County. The proposed plant will process alumina from the bauxite ore imported from Jamaica where Reynolds Jamaica Mines, Ltd., a subsidiary, is developing ore deposits.

When completed, the integrated facilities will be able to produce 160 million pounds of aluminum annually.

Ordnance Plant Switch: Mathieson Chemical's occupation Jan. 1 of the Morgantown, W. Va., ordnance works will mean ammonia and methanol in five to seven weeks (*CW Newsletter*, Jan. 5), but for the Sharon (Pa.) Steel Corp. it means purchase of coke on the open market. While Sharon gets some coke from its plant at Fairmont, W. Va., and from beehive ovens at Mt. Pleasant, Pa., much of its needs came from Morgantown. The government recently cancelled Sharon's contract to operate coke ovens there, but let it operate on a month-to-month basis until Dec. 31.

Natural Gas Notes: Decision on whether gas from Alberta province may be exported to the U.S. is expected in early February, and on the basis of greatly increased known reserves, the answer most likely will be "yes."

But whether or not export is authorized, Alberta oil and gas will go to Vancouver, B.C. Construction is about to begin on a 693-mile 24-inch pipeline with completion scheduled for 1953.

Farther south, natural gas deliveries to the Pacific coast from Texas and New Mexico have been upped with the installation of three new compressor stations on Pacific Gas and Electric's "Super Inch" line.

Dicalcium Phosphate: The newly-formed Shea Chemical Corp. will construct a \$3 million plant for production of dicalcium phosphate via electric furnace elemental phosphorus at God-



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Every month Monsanto publishes three pages of pertinent information which may be helpful to you. This issue discusses:

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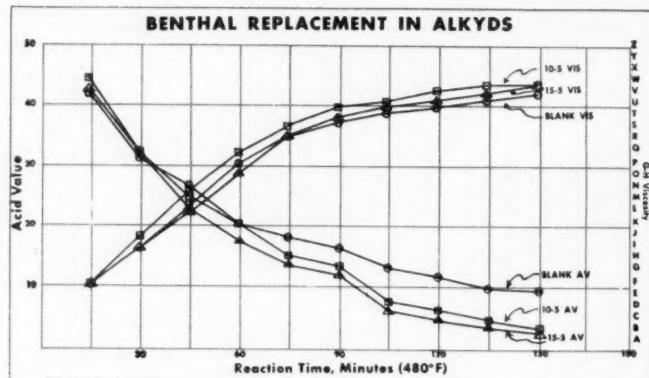
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If a shortage of phthalic anhydride is hindering your production, it will be worth your while to investigate Benthal.*

The chart above illustrates the Benthal-maleic anhydride performance compared to straight phthalic anhydride in a long oil formulation of the 52R 13 type. The following explains the graph:

In the Blank, 70.5 parts phthalic anhydride were used. In the 10.5 series, 10.5 parts by weight of phthalic anhydride were replaced with a combination of 7.1 parts Benthal and 3.5 parts maleic anhydride. In the 15.5 series, 14 parts phthalic anhydride were replaced by 10.5 parts Benthal and 3.5 parts maleic anhydride.

Fusion processed at 480° F. using agitation of 600 ft. per minute, peripheral

speed, and 0.04 cu. ft. per min. of inert gas (CO_2) per gallon of batch. (Benthal and maleic anhydride added with the phthalic anhydride.)

Film Evaluation (0.5% Pb., 0.05 Co. on solids).

(1) Air Drying time

	MINUTES		
	Blank	10.5 series	15.5 series
Set to touch.	80	80	115
Dust Free . .	100	100	150
Dry	270	270	300

(2) Reaction rate: about equal to Blank.

(3) Hardness: Blank and 10.5 series equal. 15.5 series, slightly softer.

(4) Alkali and water test: About equal.

(5) Durability: About equal.

This alkyd differs from a 52R 13 type only in that it has a lower phthalic content.

Write for literature on Monsanto detergents

Your request to the nearest Monsanto Sales Office or to Monsanto Chemical Company, Phosphate Division, 1700 So. Second Street, St. Louis 4, Missouri, will bring you any of the following pieces of literature.

Booklet—"Santomerse No. 1 All-purpose wetting agent and detergent."

Technical Bulletin P-123—Describing Santomerse D, Santomerse S, Santomerse No. 3 and Santomerse No. 3 Paste.

Technical Bulletin P-129—Describing the properties and uses of Sterox* CD.

Technical Bulletin P-133—Describing Sterox SE and Sterox SK.

Technical Bulletin P-136—Describing Sterox No. 5 and Sterox No. 6.

Technical Bulletin P-122—Describing Detergent MXP.

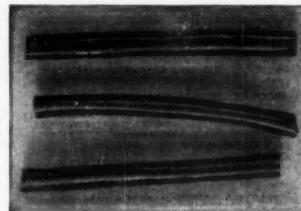
Technical Bulletin P-142—Describing Emulsifiers H, L, M and R.

Technical Bulletin P-146—Covering the use of Santomerse S for metal processing in acid media.

Milmer 1 prevents mildew in polyvinyl chloride



Mildew destroyed this insulation.



Milmer 1 made this tubing mildew-resistant.

Such problems as mildewed shower curtains and embrittled insulation caused by fungus attack can be eliminated by the use of Monsanto Milmer 1 (Copper 8-Quinolinolate-T).

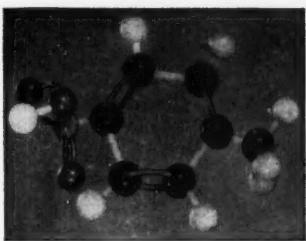
Milmer 1 prevents fungus deterioration of vinyls. Extensive military tests have shown that Milmer 1 affords vinyls superior protection from such attack.

Sometimes effects of fungi are visible on products made from vinyls. At other times the fungi may not be visible but the plastic loses its flexibility and cracks. These ill effects are due to fungi eating away the plasticizer.

Milmer 1 is practical to use in vinyls. Properly applied, it does not crock or bloom. It is nontoxic and permanent.

In addition to protecting scores of vinyl industrial products, Milmer 1 is an effective means of preventing fungus damage in paper, textiles and leather.

If you have the problem of fungi shortening the useful life of your product, investigate Milmer 1. Contact the nearest Monsanto Sales Office for technical assistance in the application of Milmer 1. Mail the coupon for a copy of Monsanto Progress Report, "A guide to formulating and applying Milmer 1."



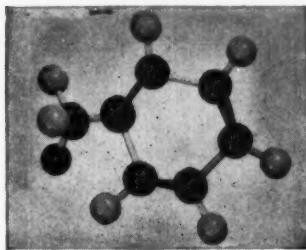
Toluenesulfonic Acid

You can get immediate delivery of toluenesulfonic acid from Monsanto. Toluenesulfonic acid is used as a dyestuff intermediate and as a catalyst in certain organic reactions.

Typical Analysis

Appearance and Color . . . Greenish to black viscous liquid or semicrystalline solid

Molecular Weight	172.20
Toluenesulfonic Acid	94.0% min.
H ₂ SO ₄	1.0% max.
Water	2.0% max.
Toluene	0.2% max.
Para Isomer	80.0%
Ortho Isomer	20.0%



Benzyl Chloride

Benzyl chloride is a highly reactive aralkyl halide used in producing dyestuffs, perfume bases, acetate and other esters, plasticizers, resins, wetting agents, germicides, rubber accelerators, gasoline gum inhibitors, benzyl benzoate and various pharmaceuticals. Benzyl chloride is available for immediate shipment from Monsanto.

Typical Analysis

Appearance and Color Clear to slightly turbid, colorless to yellow liquid

Molecular Weight 126.58

Specific Gravity at 15.5°/15.5° C. 1.105-1.110

Distillation Range:

First Drop 177.5° C. min.

95% (1.96 ml) 3.0° C. max.

Dry Point 185.0° C. max.



SANTOMERSE® No. 1

the all-purpose detergent
and wetting agent

COMBINES . . .

1. Surface Activity
2. Detergency
3. Wetting
4. Sudsing
5. Cleaning

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To build a general-purpose cleaner, you need an all-purpose detergent and wetting agent. One that has a number of very desirable qualities—all equally effective—all working together—none overdeveloped at the expense of the others.

You need Santomerse No. 1!

Santomerse No. 1 is truly the modern all-purpose, synthetic, organic detergent and wetting agent. It possesses the unique and effective combination of the following valuable properties—(1) Wetting Out, (2) Dispensing, (3) Emulsifying, (4) Penetrating, (5) Cleaning Action . . . It is also a fast, thorough rinser; holds dirt in suspension, floats it down the drain before it can be redeposited on cleaned surfaces. Prevents formation of insoluble curds.

Santomerse No. 1 functions very satisfactorily in hot or cold, hard or soft water, or in acid or alkaline solutions.

Free-flowing Santomerse No. 1 can be readily blended with other materials, has excellent bulking characteristics.



Typical products employing HB-40
as a co-plasticizer

HB-40

If you're interested in a plasticizer that helps reduce your cost and maintain your product quality, learn about HB-40 . . . It is a relatively nontoxic, high-boiling, colorless liquid that carries special interest as a low-cost plasticizer for Polystyrene Casting Resins, Polystyrene Adhesives, Molding Polyvinylcarbazole, Vinyl Extrusions, Vinyl Plastics and Organosols, Vinyl Calendered Film and Sheetings, Ethylcellulose Injection Moldings, Strip Coatings for Metals, Floor Tile Compositions, Asphalt Base Paints . . . Available Now—Drums, Carloads.

Full information in Bulletin No. P-104.

AE-1

Some indicated uses for this NEW high-molecular-weight ALCOHOL ESTER . . .

1. Defoamer 2. Co-plasticizer in rubber hydrochloride and chlorinated rubber 3. Plasticizer for unsaturated aldehydes 4. Plasticizer for pressure-film coatings 5. Extender in amineplastik systems 6. Dispersion agent for pigments in vehicles and pebble-mail grinding of pigment pastes 7. Resin modifier for asphalt and other bituminous compounds 8. In printing inks 9. Flow aid and lubricant for clay coating paper 10. Wax modifier 11. In detergents and softeners.

For more information, send for Technical Bulletin No. P-140. SAMPLES FURNISHED ON REQUEST.

MONSANTO CHEMICAL COMPANY, 1700 So. Second Street, St. Louis 4, Missouri. District Sales Offices: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

*Reg. U. S. Pat. Off.



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- Toluenesulfonic Acid.
- Benzyl Chloride. AE-1. HB-40.
- Santomerse No. 1. Benthol.
- SEND LITERATURE:
- Progress Report (Milmer I).
- Bulletin P-142 (Emulsifiers H, L, M and R).

MONSANTO CHEMICAL COMPANY
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Particularly in demand are chemicals required for electronic purposes.

If you need such chemicals—either for defense or for civilian use, or for both—inquire first of Baker. Baker is adjusting its facilities to meet **emergency** needs, and can supply you with tonnage chemicals to known standards of purity. We will also be glad to discuss, in confidence, your requirements for tonnage chemicals to your own exacting specifications.

Baker has long been trained in the art of exactness. It has, for many years, supplied chemicals to a defined purity "by the ton." We invite you to call upon Baker—and to depend upon Baker as a reliable source of supply.

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Strontrium Carbonate
Strontrium Nitrate
Triple Carbonates



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win, near Columbia, Tenn. Capacity of the plant will be about 70,000 tons of dicalcium phosphate per year. The corporation is affiliated with the Hoosac Valley Lime Co., Adams, Mass., which has been manufacturing the phosphate from merchant phosphorus.

Uranium-235: The new \$227 million gaseous diffusion plant for U-235 production at Oak Ridge, Tenn., has been completed and turned over to Carboide and Carbon Chemicals Corp., which operates Oak Ridge facilities of the Atomic Energy Commission. The new plant, half again as large as the original gaseous diffusion plant built during the war, will be capable of producing a "vastly increased" volume of the isotope with approximately the same 2,750 workers now employed in the separation work.

Vinyl Acetate Polymers: National Starch Products, Inc., has begun a \$2 million plant expansion to double present production facilities for vinyl acetate polymers and copolymers. The increase will make it possible for the company to sell these resins, where it previously has had only captive production.

DDT: Alabama Chemical Co., manufacturer of DDT and other insecticides at Huntsville, Ala., will construct a new \$500,000 plant at McIntosh, Ala., near Mathieson's caustic-chlorine plant, slated to begin production July 1. Alabama intends to have its facilities ready almost simultaneously.

COMPANIES . . .

Kaiser Aluminum: An \$18,750,000 convertible preferred stock issue was marketed last week. The offering consisted of 350,000 shares with a \$50 par value, interest rate, 5%.

Monsanto Chemical: A \$66 million debenture issue which was to be sold on the open market during March and April, has instead, been sold privately to six institutional investors. The 50-year, 3.75% issue bears cumulative interest, payable annually only if earned.

U.S. Rubber: The company has arranged for a \$50 million sinking fund to increase working capital for defense expansions. Interest on the loan—due in 31 years—will be 3.75%.

Brunswick Pulp and Paper: This bleached sulfate pulp producer has sold a \$2,011,000 promissory note,



Again, in 1952, carloads of crushed, powdered, and granulated chemicals will be packed and shipped in . . .

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due in 1970, to New York Life; and \$697,000 in notes, due from 1952-55, to J. P. Morgan and associates. The Brunswick, Ga., company is a joint venture of Scott Paper and the Mead Corp.

American-Canadian Uranium: This Marmac Syndicate and Pax Athabasca Uranium-controlled company has filed a registration statement for 850,000 shares of common stock, 10 cents par value, which is to be marketed for \$2 a share. The money is to be used for exploration and development work.

FOREIGN . . .

Chemical Pulp: A \$33 million newsprint and chemical pulp plant—New Zealand's first—is to be located at Te Puke, 165 miles southeast of Auckland. Built for Tasman Pulp & Paper Co., the mill has an estimated capacity of 150 tons of bleached sulfate pulp and 175 tons of newsprint annually.

Bauxite: A bauxite reduction plant now under construction by the Reynolds Metal Co. in Jamaica will be in production early this spring. Involving an expenditure of more than \$17½ million (piers, storage bins, tramways, process and power plants are all under way) the new works will process 750,000 tons of bauxite yearly.

Synthetic Filaments: A boost in the Australian imports of synthetic filaments can be expected this year: Output of woven synthetics is expected to jump to 21.5 million yards—an increase of 85% over 1951 figures.

Equipment: Included in an \$850,000 shipment of scientific equipment recently received by various Israeli institutions, is a complete chemical pilot plant destined for joint use by the Research Council of Israel and the Polytechnical School in Haifa. This is but one of 40,000 such items ranging in value from a few cents to thousands of dollars recently purchased from allocations from an Import-Export Bank loan to Israel. Additional equipment in the amount of \$125,000 is expected from the U.S. in the near future. More will be forthcoming if a supplementary application being made under the \$65 million grant-in-aid is approved.

Aluminum: Location of an American-built aluminum plant in the Sao Francisco Valley of Brazil, drawing power from the Paulo Afonso hydro-



Chemical Progress

News of developments from General Electric's Chemical Division that can be important to your business.



NEW G-E PAINT RESIN DRIES
DUST-FREE IN ONLY MINUTES

A new General Electric Glyptal* alkyd resin, which air-dries dust-free in 5 to 10 minutes, and tack-free in 3 to 4 hours at 77 F, is among the recent contributions of G-E chemical research to the paint industry. The new resin (G-E 7422) is designed to expedite the painting and priming of many industrial and consumer goods.

G-E 7422 is economical, too! Fast baking, it permits shorter oven cycles . . . and it requires less amine resin addition than other Glyptals to get hard, mar-proof, yet flexible coatings. This paint resin is a medium, pure, oil-modified alkyd, free of rosin, phenolic, styrene or other modifiers. Exceedingly versatile, it is recommended for a variety of applications: appliance and furniture finishes, automotive and Venetian blind enamels, and as a primer for metal goods. It imparts excellent color retention, adhesion and toughness as well as humidity and salt-spray resistance to formulations.



Plastics Desk Tops. In line with the recent trend to plastics tops for school desks, G.E. has designed a G-E Textolite* color pattern with special reflectance and low-glare properties. Tested and approved by leading lighting authorities, this surfacing is a result of G-E research in superior resins and varnishes for plastics laminating.



New Glass-bonded Mica. Bases for Klixon[†] Thermo-Snap controls are being molded of a new G-E mycalex grade developed through G-E chemical research. G-E mycalex gives the switch base high dielectric strength and temperature resistance (up to 700 F), molded-in inserts, and high dimensional stability which facilitates precision assembly.

* Reg. Trade-Mark, Spencer Thermostat Co.

Salt-spray resistance of G.E.'s new alkyd resin is demonstrated in this photo. Both panels are coated with the same primer. The coating at the left, using an ordinary alkyd resin as a vehicle, is rusted and corroded. The right-hand coating, using G-E 7422, shows no ill effects after exposure.

For more details about any of the G-E chemical products mentioned on this page, just write to Chemical Division, General Electric Company, Pittsfield 11, Massachusetts.

* Reg. U. S. Pat. Off.

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Concentrated "Virginia" Zinc Hydrosulphite is prepared by us expressly as a reducing and bleaching agent for many industries, chief among which is the pulp and paper industry. It is the only high test ZnS_2O_4 available commercially.

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"Virginia" is constantly researching new and improved applications of these three standard reducing agents. Bring us your problems. Perhaps one of these chemicals can be used to advantage in your products or processes, and can cut your production costs. Our technical counsel—backed by 29 years of experience—is freely available.

Write today for our descriptive folders on any of these products. Ample experimental samples of Zinc Hydro and Sodium Hydro are yours for the asking. Virginia Smelting Company, Dept. CI, West Norfolk, Virginia.

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electric station, is being considered by the government's Industrial Development Commission. Full endorsement of the plan seems most likely since it has President Vargas' recommendation. To be built and operated by the Reynolds Metal Co., the plant will have an annual capacity of 100,000 tons.

KEY CHANGES . . .

John R. Hoover: From sales vice president to president, B. F. Goodrich Chemical Co.

Albert E. Forster: From general manager, Naval Stores Department, to vice president and member of executive committee, Hercules Powder Co.

Bruce A. Hainsworth: From district chief engineer, H. K. Ferguson Co., to director of engineering, E. R. Squibb & Sons.

Clayton S. Shoemaker: From eastern sales manager, Dow Chemical Co., to president, Dow Chemical Inter-American, Ltd., and Dow Chemical International, Ltd.

C. W. Turner: To president, American Bitumuls & Asphalt Co.

C. W. Stewart: From president, American Bitumuls and Asphalt Co., to vice chairman, board of directors, Standard Oil of California.

Clayton F. Ruebensaal: From technical director, plastics and resins, to commercial development manager, Naugatuck Chemical Division, U.S. Rubber Co.

Earle E. Langeland: From plant manager, Hammond, Indiana Works, to vice president in charge of production, American Maize-Products Co.

Brainard R. Taylor: To vice president in charge of planning and development, American Maize-Products Co.

Arvie P. Mills: Retired vice president and general manager, Desoto Paint & Varnish Co. (Memphis), to chief, Protective Coatings Branch, Chemical Division, NPA.

G. L. Glespen: From technical supervisor, petroleum chemicals department, American Cyanamid Co., to chief, Chemicals and Packaging Branch, Petroleum Administration for Defense Materials.

Floyd L. Miller: Director, research division, Standard Oil Development Co., to vice chairman, Research and Development Board, Department of Defense.

STOKES HIGH VACUUM EQUIPMENT... for every requirement of vacuum processing

Modern design of Stokes vacuum equipment develops from the continuing contact of Stokes Engineers with processors in many fields.

Stokes Microvac Pumps — basic to vacuum processing — are designed for the broadest requirements of industry.

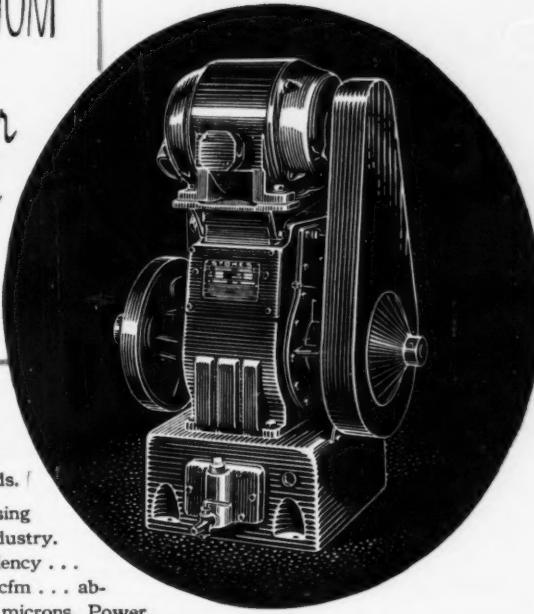
They have high volumetric and mechanical efficiency . . .

capacities of 15 to 500 cfm . . . absolute pressures to 10 microns. Power consumption is low. Compact design with top-mounted motor requires minimum floor space.

There are but four moving parts including the high speed, full-opening exhaust valve of corrosion-resistant Teflon. Lubrication is completely automatic, without packing, stuffing-boxes or grease fittings. Wear is kept to a minimum, and long trouble-free service assured. Parts are precision-finished, standard and interchangeable.

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ONYX BTC* has been exhaustively tested by an independent biological laboratory. You can depend on its safety. We'll be glad to send separate toxicity test data—but you'll find it all included in the BTC Handbook, illustrated below.

IT'S A UNIFORM CHEMICAL COMPOUND

ONYX BTC is produced under rigid technical control, which holds its mixture of alkyl radicals at optimum bactericidal effectiveness. We can also supply BTC to meet USP specifications for benzalkonium chloride.

IT DOES NOT DETERIORATE IN STOCK

ONYX BTC shows no trace of chemical, bactericidal or physical change, no matter how long it is kept in storage.

IT HAS BEEN ACCEPTED IN FIELD USE

ONYX BTC for many years has been the most widely used concentrated cationic bactericide and deodorant. Its use in the type of products you make in all probability has been thoroughly tested and proved. On the other hand, if you have in mind a new application, we have ample data on related uses which will enable us to work out together the formulation you will require. Onyx BTC is sold in 50% aqueous solution to manufacturers for dilution and/or incorporation in their products.

WRITE FOR THE BTC HANDBOOK...containing the complete story of its characteristics and uses. Onyx makes many other quaternary ammonium salts. Let us know of any particular types in which you are interested.



*Trade Mark Reg. U. S. Pat. Off.

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RESEARCH

Pyridine Emancipated

Commercial production of 2-methyl-5-ethyl pyridine (MEP), by Carbide and Carbon Chemicals Co., frees this and a number of other substituted pyridines from dependence on coal tar.

Niacin and niacinamide manufacture are waiting outlets for MEP, but the product's new easy availability is spurring applied research in several fields.

Within the coming week, Carbide and Carbon Chemicals Co. (of Union Carbide and Carbon Corp.) will be ready with the first shipment of 2-methyl-5-ethyl pyridine from its brand-new unit at Institute, W. Va. This news is hardly unexpected—Carbide has piloted MEP for more than a year—yet its full significance probably won't be appreciated for some time.

Today the picture is relatively



CARBIDE'S BATEMAN: He compressed the seven-year cycle.

simple: MEP has one, and only one, substantial market—in the manufacture of the B-vitamin, niacin. Carbide doesn't make niacin, and doesn't intend to. But its MEP is changing the face of niacin manufacture, wooing producers away from familiar coal tar starting materials.

Ever since pyridine and quinoline replaced nicotine as raw materials in the commercial synthesis of niacinamide and niacin, vitamin producers have been tied to the apron strings of an often temperamental coal tar mistress. Recently, this has been a painful liaison. Raw material shortages have had producers of the vitamin on the ropes more times than they care to admit.

Every one deplored the situation, but little was done about it until August of last year when Nepera Chemical Co., Inc. (Nepera Park, N.Y.) went the MEP way in its niacinamide production. Like Carbide, Nepera makes MEP from acetaldehyde and ammonia. But Nepera's MEP is chiefly a captive product, noteworthy for the interest it sparked if lacking the impact of a freely available industrial intermediate.

One fact is painfully clear: MEP is currently a one-use product. If some one were to come up with a better niacin synthesis (by-passing MEP), Carbide would be out of luck. MEP's future industrial security obviously hinges on the development of substantial, new applications.

Early But Hopeful: Research now is under way on this problem in a number of quarters. It's a little too early for results, but several lines of investigation are promising. Quaternaries made from MEP are being eyed by researchers of Boyce Thompson Institute for fungicidal and bactericidal properties. Another hopeful lead is based on the reduction of MEP to the corresponding piperidine for rubber processing applications.

On the surface it might seem that MEP could compete with pyridine as a solvent. This is hardly the case; the two compounds differ markedly in their boiling points, solubilities, etc. Nevertheless, MEP's solvent potential cannot be altogether discounted.

One other possible large-scale outlet for MEP: in the production of 2-methyl-5-vinyl pyridine for synthetic fibers. Consideration of this as an MEP outlet may soon be academic, for Phillips Chemical Co. is due to bring in its Port Adams (Deer Park, Tex.) methylvinyl pyridine plant by midyear.

In addition to MEP, Carbide produces picoline, methylbutyl pyridine, methyloctyl pyridine and other higher-substituted pyridines as co-products of the ammonia-acetaldehyde synthesis. Commercial synthesis of these erstwhile exclusively coal tar chemicals from abundant raw materials



of

- DIGLYCOL
- ETHYLENE GLYCOL
- DIETHYLENE GLYCOL
- POLYETHYLENE GLYCOL

-
- PROPYLENE GLYCOL
 - POLYOXYETHYLENE
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Fluid only contacts outer surface of "FLEX-I-LINER" and inner surface of body block. 35 combinations of rubber and plastic "flex-i-liners" and pump body blocks. Models available from fractional to 20 G.P.M. Vinyl and Compar "flex-i-liners" available in pumps to 5 G.P.M. capacities. Widely used in chemical, food, pharmaceutical and other process industries — wherever non-contaminating pumping is required. Excellent for slurries. Write for literature.



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flex-i-liners



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NO GASKETS
NO VALVES
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RESEARCH

might well inject new interest in their industrial development.

Carbide's entire output, on the other hand, is for sale; and the chances are it won't suffer from a dearth of buyers. Merck & Co., which makes both niacin and the amide, recently switched over from quinoline to a new undisclosed and "unlimited" starting material. Merck is being coy, not saying what its mystery substance is; but the consensus in the industry is that you could give odds on MEP and have a hard time finding a taker.

Nepera might also find it to its advantage to abandon MEP production in favor of purchasing the intermediate for its vitamin manufacture. Edmond T. Tisza, Nepera's vice president-research director, told CW that this is a distinct possibility, although the company hasn't any definite plans at this time.

Coal to Vitamin: Regardless of how many niacin producers go over to MEP, Barrett Division (Allied Chemical and Dye Corp.) probably will stick to the time-honored coal tar starting materials. Barrett may be

bucking a trend, but not without ample justification. A leading producer of both pyridine and quinoline, Barrett's niacin manufacture is an integrated operation from coke oven to packaging plant.

What the future holds for MEP is a question that Carbide would give a lot to have answered. A growing demand for niacin was an important factor in the company's decision to go ahead with large-scale MEP output. Niacin is growing all right, but not as fast as a lot of people would have you think. New uses in the enrichment of pig feeds and Oriental rice are distinct market-boosting possibilities, but right now (and contrary to rumor) Carbide has more MEP capacity than it has sold and makes no bones about saying so.

MEP could rightly be called the prodigy of the Carbide Chemicals family. Thanks chiefly to Fine Chemicals Manager R. L. Bateman, MEP came from the research laboratory to commercial production in less than half the oft-quoted "seven years from test tube to tank car" cycle.

Old Trick Gets A New Twist

A new test for detecting the presence of oils, greases and fats on metal surfaces is attracting a lot of attention in the plating industry. The test is based on the familiar observation that water forms a film on clean metal surfaces, droplets on soiled.

Dubbed the "atomizer test" by its inventors, Henry B. Linford and Edward B. Saubestre, of Columbia University, the method is an eye-opener both for simplicity and sensitivity. Linford puts it this way: "All that's needed is an atomizer selling for \$1.50, a supply of distilled water, and a source of compressed air at a pressure of nine pounds per square inch. A high-school graduate could learn to operate the test in a day's time."

Here's how it works. The metal panel to be tested is hung up dry and bathed in a spray of distilled water for a little more than a half-minute. If the water forms a film, the panel is clean; droplets indicate a soil. Saubestre found his atomizer test far more effective than other wetting tests in use. In solvent cleaning, the new procedure proved ten times as sensitive as the most common conventional test.

Other methods (using radioisotopes and fluorescent materials) for detecting grease on metal have been tried, but none found more sensitive or re-

liable than the newly developed Columbia technique. From a practical standpoint, many of the methods investigated were too complex and expensive for the average plating establishment.

Double Duty: The atomizer test has two chief uses in commercial plating operations. Most important is in determining when cleaning solutions have been exhausted. But another important application will be in evaluating the relative efficiencies of commercial metal cleaning solutions. Older tests usually weren't sensitive enough for this job; almost any cleaner's work was good enough to get by.

Having successfully dealt with the problem of a superior grease test, the Columbia team—supported by an American Electroplater's Society grant—next will tackle oxide contaminants and an investigation of the physical structure of metal surfaces.

RFC Research: In a year-end review of its synthetic rubber activities, the Reconstruction Finance Corp. disclosed it has spent more than \$6 million on rubber research. Of this, 28% went toward fundamental research, 10% for applied, and 62% for development.

The Government agency considers the following its most noteworthy achievements: development of three

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Briefs

From recent literature

No. 3 in a Series

Improved dyed nylon fibers are obtained by following a conventional dying and fixing procedure with passage of the dyed fiber into 75% aqueous ethylene glycol maintained at its boiling point. The fastness of the dye to light, washing and rubbing is thus substantially increased.

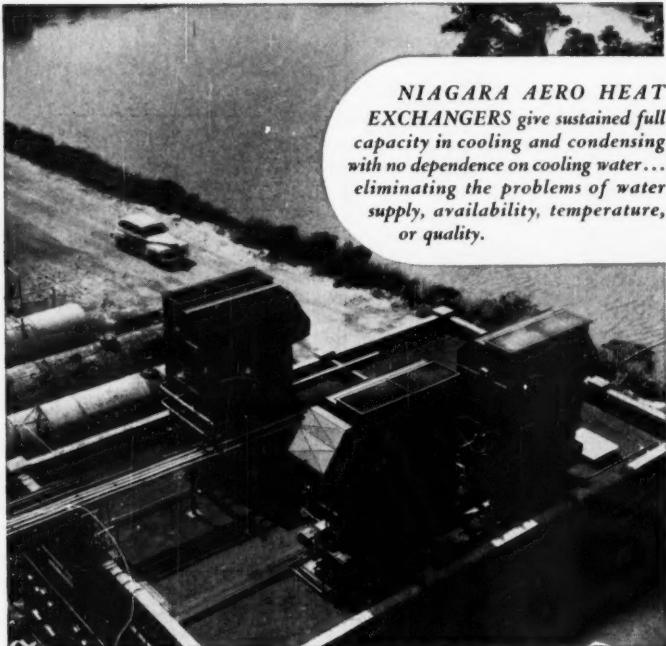
Polymers varying from viscous oils to hard resins result when ethylene glycol or diethylene glycol are reacted with divinylsulfone in the presence of a basic catalyst. Ethylene dichloride may be used as a solvent. Certain of these polymers have proven useful as thermoplastic molding compositions and in the production of fibers.

Hydrocarbons produced by the catalytic conversion of carbon monoxide and hydrogen are partially purified by extraction with ethylene glycol, which removes the oxygen-containing impurities.

Polymeric materials suitable for use as paint vehicles, coating agents for glass, and for insulation of electrical conductors result from the reaction of ethylene glycol with carboxyphenylsiloxanes.

Synthetic rubber scrap may be regenerated by devulcanizing, masticating with ethylene glycol, and then refining the product.

These developments are abstracted from recent publications or U. S. patents. They may suggest applications of Jefferson Ethylene Glycol in your products or processes.



Niagara Aero Heat Exchangers at a Plant of the Heyden Chemical Corp.

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RESEARCH

new GR-S types (raising the total to 33) and 60 new experimental GR-S types; preparation of several hundred experimental pilot-plant polymers for evaluation; development of cold latex to the point that output required expansion from 200 tons a month to 3,000 to meet demand; development and production of oil-masterbatched GR-S; improved formulations for more rapid production of both hot and cold GR-S.

Other achievements include the development of a high-butadiene GR-S and the copolymerization of vinyl toluene into a satisfactory tire tread rubber.

Penicillin Feed: Merck & Co. now is marketing a new feed supplement containing procaine penicillin as the only antibiotic constituent. The product, distinct from Merck's combination Vitamin B₁₂ and Antibiotic Feed Supplement, is designed to meet the needs of feed manufacturers who wish to use procaine penicillin alone or in combination with other growth stimulating factors.

Frank M. Parker, the company's sales director, says procaine penicillin is generally accepted as the most active, consistent and prolongedly effective antibiotic growth supplement for poultry of any tried by the feed industry. According to Parker, "findings to this effect . . . have since been confirmed by many university and state experiment station workers throughout the country."

Lab Expansion: Parke, Davis & Co. is putting the finishing touches on its brand-new drug development laboratory. Another step in the company's broad expansion program, the new laboratory will house the greater part of the Products Development Department. It becomes one of the more than 50 buildings constituting the Parke-Davis reservation on the north bank of the Detroit River.

Research Boon: National Research Corp., Cambridge, Mass. recently set up The National Research Corp. Scientific Trust to which an unspecified portion of the company's net income is allotted for the support of fundamental investigations.

According to Richard S. Morse, NRC president, "There is a real need in this country for industrial support of unrestricted basic research work, and I believe that through the establishment of trust funds of this type, it will be possible to give effective aid on a long-term basis to fields of science that are so essential to the

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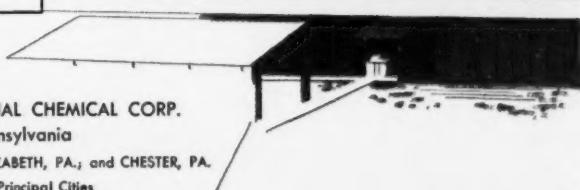


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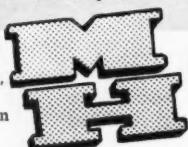
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RESEARCH . . .

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Sulfa News: Researchers at Ohio State University report a new rapidly absorbed sulfonamide which sharply reduces the kidney hazard associated with most sulfa drugs. The new drug: N-(2,6-dimethyl-4-pyrimidyl)-sulfanilamide.

New Acrylics: American Polymer Corp., Peabody, Mass., is out with two new acrylic thickeners. The products, called Polyco 296BT and 296N, are water-soluble anionic colloids in the form of straw-colored, homogeneous solutions containing 15% solids. They are recommended as stabilizers, protective colloids and thickeners for rubber and other resin latices. Other industrial applications are suggested by their good adhesive, suspending, emulsifying and film-forming characteristics.

Bismuth Test: Indian researchers report that diallyl dithiocarbamido hydrazine forms bright orange solutions with bismuth which may be used in colorimetric determinations of the metal at a pH between 2.4 to 2.7.



Design for Research

TO MEET the unpredictable needs of its researchers, Army Medical Department Research and Graduate School (Wash., D.C.) has recently set up the Biophysical Instrumentation Department. The new unit, one of the best equipped installations of its kind, designs and makes special equipment for the school's research laboratories. Joel Warren, head of the Virus Research Section, examines a current project — an experimental freeze drying unit.



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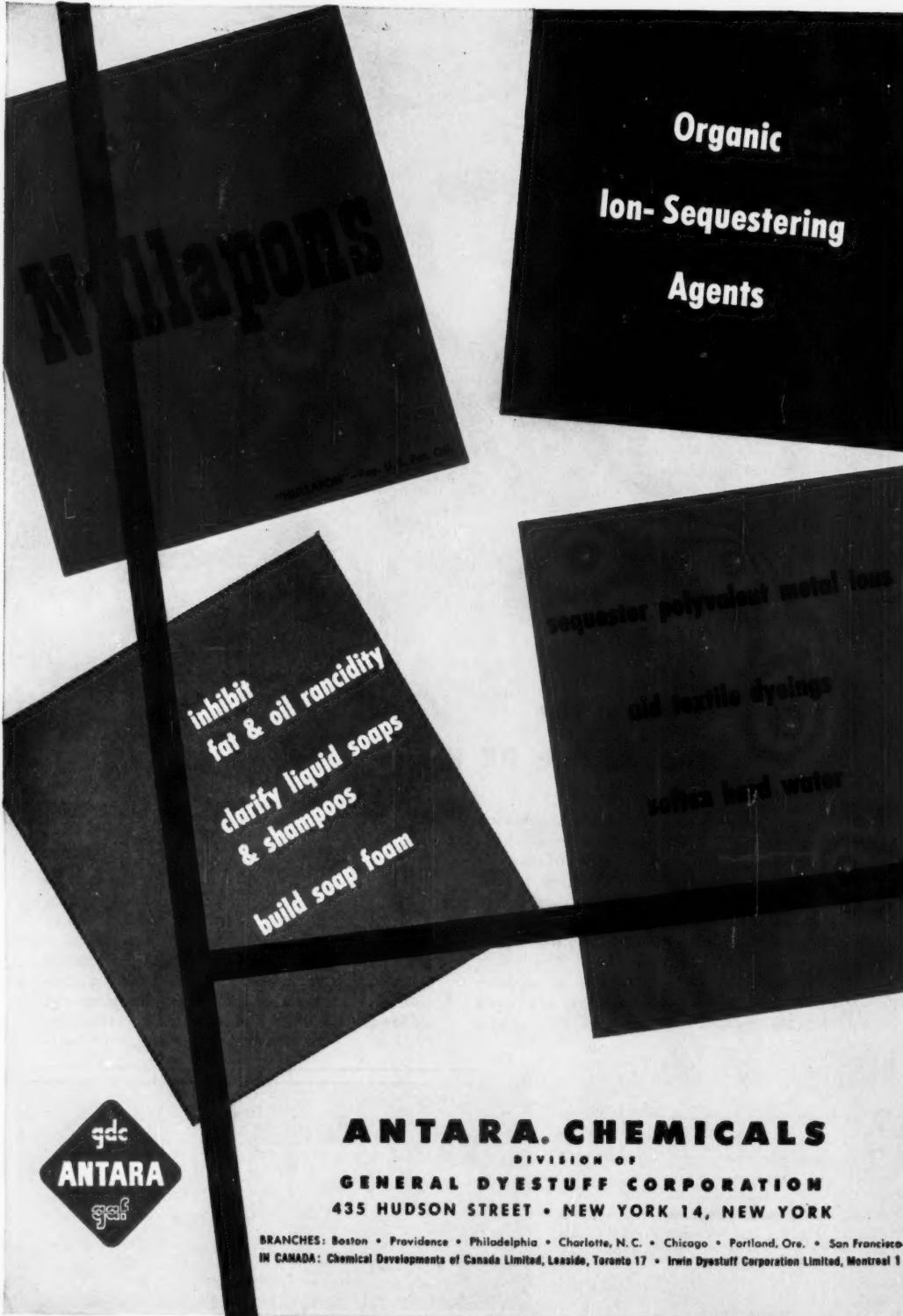
PX-104	DiButyl Phthalate
PX-108	DiIsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DiIsoOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DiIsoOctyl Sebacate
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SPECIALTIES . . .

Cation Custodians

Chalking up \$1 million in sales for '51, producers of ethylene diamine tetra-acetic acid, its salts and derivatives, look toward a 50%-60% boost this year, even more in '53.

The chemical industry finds these compounds indispensable as sequestering agents in a host of manufacturing processes: preparation of soaps, textiles, and rubber are but a few.

A trace of calcium in the diet may be a wonderful and necessary thing, but in your shampoo it's likely to be present as an unsightly curd at the bottom of the bottle.

A few parts per million of manganese or cobalt in soap may cause it to turn rancid; and micro quantities of iron, copper, tin, or zinc in dyestuffs (or the water used to prepare dyeing solutions) will result in streaking, spotting, dullness, crocking, poor color yields, and serious color changes.

Small amounts of metal salts inactivate enzymes, reduce production yields; embrittle rubber; promote the darkening of foods, the clouding of wines.

That's where the sodium salts of ethylene diamine tetra-acetic acid (EDTA) and its derivatives come in: Used in trace amounts to counteract trace impurities, these chelating agents* inactivate metallic ion contaminants in solution by forming soluble and very stable complex compounds powerless to interfere with the process at hand.

Actually this sequestering action of EDTA salts has been known for some time. As long ago as 1929, Frederick C. Bersworth (holder of some 105 process and product patents involving these chelating agents), working at Clark University, prepared the acid but neglected to patent it.

A patent on EDTA was later obtained in 1935 by General Aniline & Film Corp. in Germany, but it wasn't until the end of the war that EDTA compounds were made and used in any quantity.

Nice Business: But now they're beginning to develop into a nice specialty business. Last year more than \$1 million's worth of EDTA, its sodium salts and derivatives were sold, and this year's sales are expected to run 50%-60% ahead of that. Present markets are expanding, new ones are opening up. Biggest single use today is in the soap industry. Added to liquid soaps, these agents inactivate iron, cal-

cium and magnesium completely, thus "soften" the water.

They act as anti-oxidants to prevent rancidity and change of color, and increase "shelf life" by inhibiting the precipitation of silica from glass. A "natural" soap containing EDTA salts will be able to compete successfully with synthetic detergents in hard water areas; and synthetics, on the other hand, will be more efficient, give sparkling whites and brilliant colors.

In the textile industry EDTA compounds are especially valuable: When used in wool fulling operations, they prevent the formation and deposition of insoluble soaps on textile fibers. In such cotton textile operations as kier boiling, mercerizing, batch and continuous bleaching, and sanforizing, they inhibit iron staining, produce noticeably whiter cloth.

Used in rubber processing, EDTA and its compounds remove copper and manganese ions which have a great tendency to embrittle the rubber.

As a latex stabilizer these chelating agents prevent decomposition, coagulation, sludge formation, and putrefaction. In synthetic rubber production alone, use of these materials has increased output 10%-30%.

And these are but a few of the present day markets. EDTA salts are used in electroplating to complex the impurities in the plating baths; in soaker alkali solutions to remove scale from bottle-washing equipment and prevent further scaling. They have been found helpful in purification of inorganic salts and of fats and oils, preparation of pharmaceuticals, stabilization of lanolin-containing cosmetics.

Sharing the Cake: EDTA, its salts and derivatives are currently produced by three companies: Alrose Chemical Co. (Sequestrenes), Bersworth Chemical Co. (Versenes), and Antara Products Division of General Dyestuff Corp. (Nullaprons).

General Dyestuff Nullaprons include the acid, its tetra-sodium salt, and special derivatives especially formulated for the removal of iron from caustic solutions of various pH (FAS Liquid, Fe Liquid).

Alrose* Sequestrenes include the acid and the di, tri, and tetra sodium salts of the acid; but more recent Alrose compounds (Chel 242P, Chel 330, and Chel 1000) will also remove iron from caustic solutions.

Bersworth Chemical does not make the acid at all, but it does produce the tetra sodium salts of EDTA, the iron-in-caustic specifics (Versene Fe 3, Versene Fe 3 Specific, and Versene T), and special compounds such as Calcium Di Sodium Versenate (a drug, and an anti-oxidant and preservative for drugs), and Lead Di Sodium Versenate (a viscosity controller for starch and glue formations, color and light stabilizer for vinyl plastics).

Looking Up: All three companies have under research new and better chelating agents for specific applications, for actually the market for these compounds is just opening up.

Extensive tests carried out along lines recommended by the Food and Drug Administration show that the tetra-sodium salt (specifically Versene) is non-hazardous in quantities required for metal control in food and drugs. Used in food preservation, this compound makes foods more palatable, more stable.

And in pharmaceuticals, chelating agents find two major uses:

- As stabilizers. For example, they tie up copper, which causes antibiotics to deteriorate; have thus found use in the preparation of streptomycin.

- As drugs. Calcium Di Sodium Versenate has been used experimentally to treat cases of lead poisoning, internal poisoning by radioactive materials, as an anti-coagulant and stabilizer for whole blood, and as a dissolving agent for kidney stones.

Pricewise, however, (\$0.6-\$1.00 per lb. today) the compounds are still out of reach of many big bulk markets such as the home laundry field, where they might find use synergistically with the polyphosphates, or in ore flotation, where they could aid in the selective concentration of desired minerals. But as volume goes up, prices will likely slide accordingly.

Countering this is the inevitable introduction of competing complexing agents—Dow Chemical Co.'s new sequestering agent, TTA (2-thienoyltri-fluoro-acetone), though not competitive pricewise, is a case in point—and the possible choking off by war of basic raw materials.

* Alrose manufactures its various Sequestrenes under a license from General Dyestuff; Bersworth has its own patented one-step process for making tetra-sodium EDTA which does not make use of the acid as an intermediate.

SPECIALTIES

NAME AND ACTIVE CHEMICAL QUANTITY USED PER ACRE		WHEN USED OR EFFECTIVE AGAINST	USED WITH
CMU (3-(p-chlorophenyl)-1,1-dimethylurea)	2 to 8 lbs	Purslane, smartweed, lambsquarter, Asparagus chickweed, pigweed, galinsoga, ragweed, wiregrass Pre-emergence weeding	
Crag Herbicide #1 (Formerly called E. H. #1— Sodium 2,4-dichlorophenoxyethyl sulfate)	Max ½ lb 2 lbs 5 to 6 lbs	Pre-emergence weeding " " "	Beets, growing lima beans, spinach Lima beans Muck-grown onions, pre-emergent and up to 6"
Cyanamide, granular (Calcium cyanamide)	400 to 600 lbs	Pre-emergence weeding	Asparagus, spinach
Cyanate, potassium	Spray, 0.8% KCN in water	Chickweed	Strawberries
2,4-D (2,4-dichlorophenoxy-acetic acid)	¾ to 1½ lbs	Pre-emergence weeding	Lima beans, corn
2,4-D, Pentasyl ester	¾ lbs	Wild garlic	Barley
Dinitros (Dinitro-ortho-secondary-butyl phenol)	3 to 6 lbs 3 to 9 lbs	Pre-emergence weeding Chickweed, purslane, etc.	Green and dry field beans, strawberries, snap beans Alfalfa, sweet corn
Endothal (Disodium 3,6-endoxo-hexahydrophthalate)	6 lbs 5 lbs	Pre-emergence weeding; effective against dock and clover Quackgrass	Beets, corn, soybeans, spinach, lima beans, cauliflower, potatoes Corn up to 3' high
IPC (Isopropyl N-phenyl carbamate)	4 lbs	Chickweed, purslane, smartweed, annual grasses	Spinach, at planting, when emerging
IPC, Chloro- (Isopropyl n-(3-chlorophenyl) carbamate)	2 lbs	Chickweed	Alfalfa
MCP (2-methyl-4-chlorophenoxyacetic acid)	1 lb	Emergence weeding	Fordhook, tendergreen, hawkeye, red kidney beans, legumes
NIX (Sodium isopropyl xanthate)	8 lbs	Annual grasses, purslane, ragweed	Post-emergence, at least 3 to 5 inches high: onion, corn, peas, beans, cabbage, tomatoes, eggplant, carrots, parsnips
NP-128 (o-chlorophenol-sulfonyl fluoride)	8 lbs	Pre-emergence weeding	Spinach
Oktone (Octachlorocyclohexenone)	2 to 4 quarts	Most plants	Contact killer, but has no residual soil action
Phthalamic acid	2 lbs	Pre- or post-emergence weeding	Cucurbits
N-1-Naphthyl phthalamic acid	2 lbs	Pre-emergence weeding	Vine crops
PCP (Pentachlorophenol)	20 to 40 lbs 3 to 6 lbs	Purslane, etc. Chickweed	Sweet corn Spinach
Sodium arsenite plus 2,4-D	1 lb	Crabgrass	Turf
2,4,5-T (2,4,5-trichlorophenoxy-acetic acid)	3 to 4 lbs	Thornapple	Pastures
TCA (Trichloroacetic acid salts)	50 lbs	Quackgrass, annual grasses	Cabbage, cauliflower, beets
Trichlorobenzoic acid	6 lbs	Pre-emergence weeding	Field and sweet corn where 2,4-D risky

Word on Weed Wilters

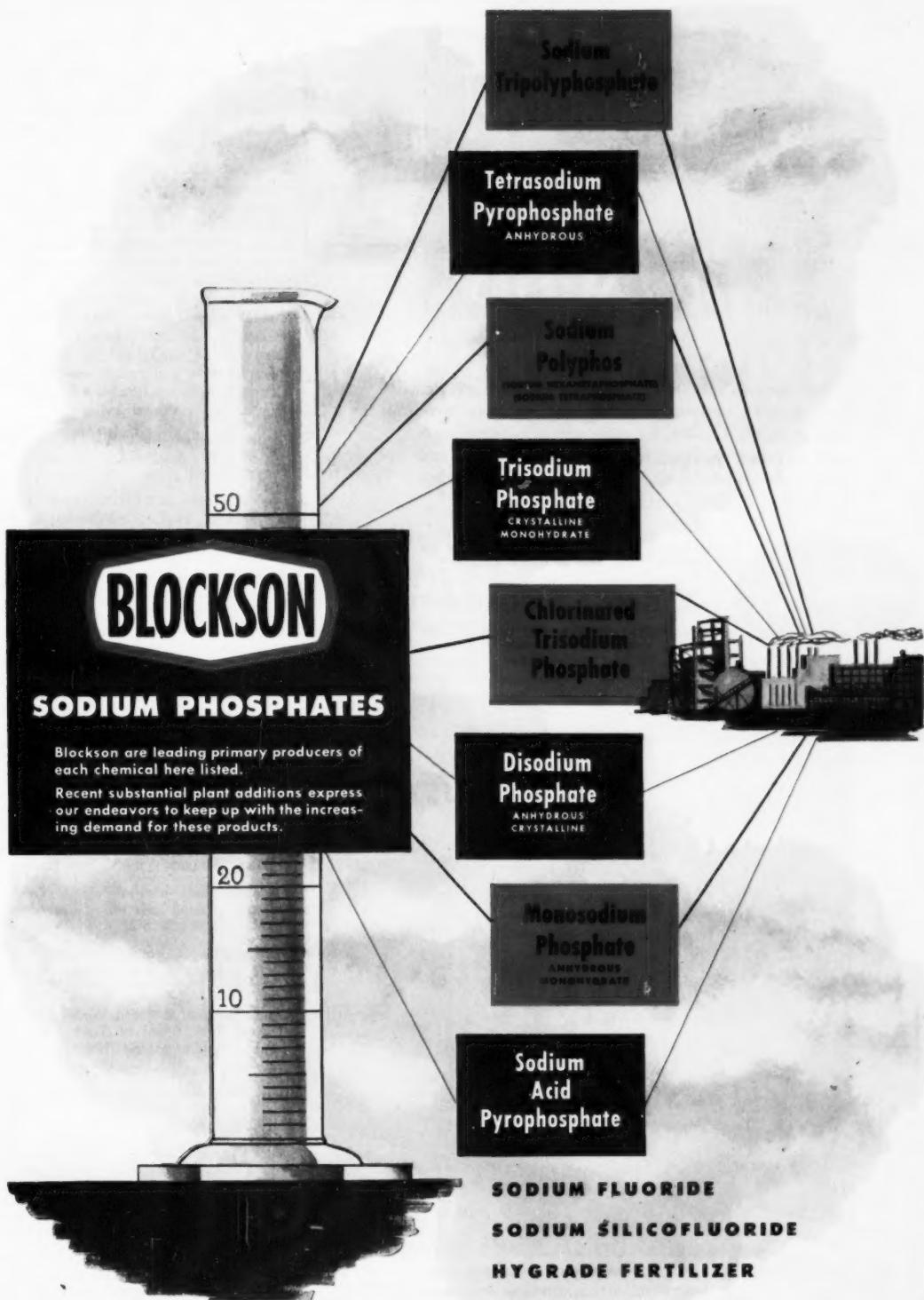
Latest word on chemicals and techniques for weed control was released at the sixth annual Northeastern Weed Control Conference in New York City, early this month. As reported previously (*CW, Nov. 17, '51*), several new agents—chloro IPC, Crag Herbicide #1, CMU—have demonstrated powerful effects. *CHEMICAL WEEK* has prepared a summarizing table of the new-

est compounds and their uses. Intended as a guide only, there is no attempt to show relative costs or effectiveness.

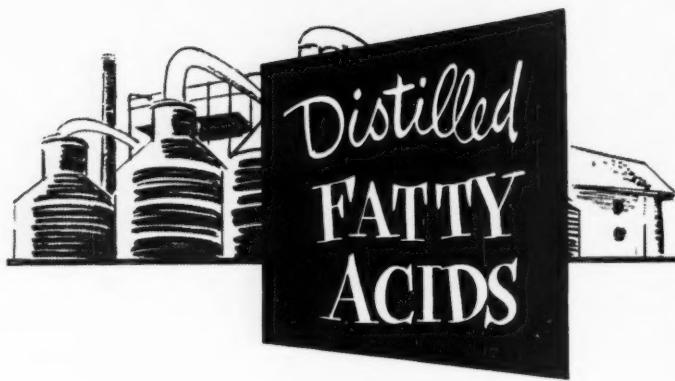
Dry-Cleaning Soap: Penn Salt has begun manufacture of a new dry cleaning soap, Flo-Klear. Sales point: Minimum replenishment is needed even when sweetener powders are

used to remove fatty acids from the dry-cleaning solvent.

Rug Cleaner: Carbona Soapless Lather is now aerosol-borne. The Carbona Products Co. (Long Island City, N.Y.) has just begun to market an aerosol-dispensed version of its nationally known soapless rug and upholstery cleaning fluid. Packed in a 10-oz. dispenser and priced at \$1, Carbona Instant Foam Lather is appearing in dime, drug, and hardware stores.



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BOOKS . . .

Treatise on Physical Chemistry, Vol. II, third edition, edited by Hugh S. Taylor and Samuel Glassstone. D. Van Nostrand Co., Inc., New York, N.Y.; 624 pp., \$12.

Five individual monographs written by experts on the subject of physical chemistry as regards the states of matter. Working from fundamental principles, the five topics discuss the properties of ideal gases from the standpoint of statistical mechanics, the thermodynamics and statistical mechanics of real gases, the properties of liquids, the solid state from the viewpoint of x-ray analysis, and the colloidal state and surface chemistry. Tables, graphs, diagrams and references clarify pertinent points.

Tensor Analysis, by I. S. Sokolnikoff.
John Wiley & Sons, Inc., New York,
N.Y.; 335 pp., \$6.

Tensor analysis, a subject drawn from the field of applied mathematics, is here developed first from the standpoint of theoretical considerations and then from an application basis. Writing for mathematicians, physicists and engineers, the author applies the theory to geometry, mechanics, relativity, elasticity, and fluid dynamics.

MEETINGS...

Compressed Gas Assn., annual meeting,
Waldorf-Astoria Hotel, N. Y., Jan. 21-22.

Assn. of Amer. Soap & Glycerine Producers, annual conv., Waldorf-Astoria Hotel, N. Y., Jan. 22-23.

Natl. Pest Control Assn., annual Eastern pest control operators' conf., University of Mass., Amherst, Jan. 31-Feb. 2.

Technical Assn. of the Pulp & Paper Industry, annual meeting, Commodore Hotel, N. Y., Feb. 18-21.

Manufacturing Chemists' Assn., air pollution abatement conf., Statler Hotel, N. Y., Feb. 25-26.

**Drug, Chemical & Allied Trades section
of New York Board of Trade, annual
dinner, Waldorf-Astoria Hotel, N. Y.,
Mar. 6.**

Natl. Assn. of Corrosion Engineers, annual conf. & exhibition, Buccaneer Hotel, Galveston, Mar. 10-14.

Natl. Farm Chemurgic Council, annual conf., Statler Hotel, St. Louis, Mar. 11-12.

Soc. of Plastics Ind., national plastics exposition, Convention Hall, Phila., Mar. 11-14.

Coml. Chem. Dev. Assn., annual open meeting, Statler Hotel, N. Y., Mar. 20.

Chicago Intl. Trade Fair, Navy Pier, Chicago, Mar. 22-April 6.

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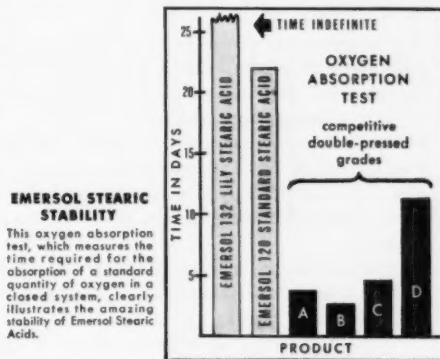
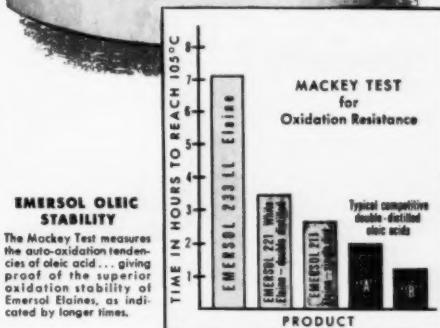
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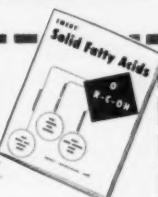
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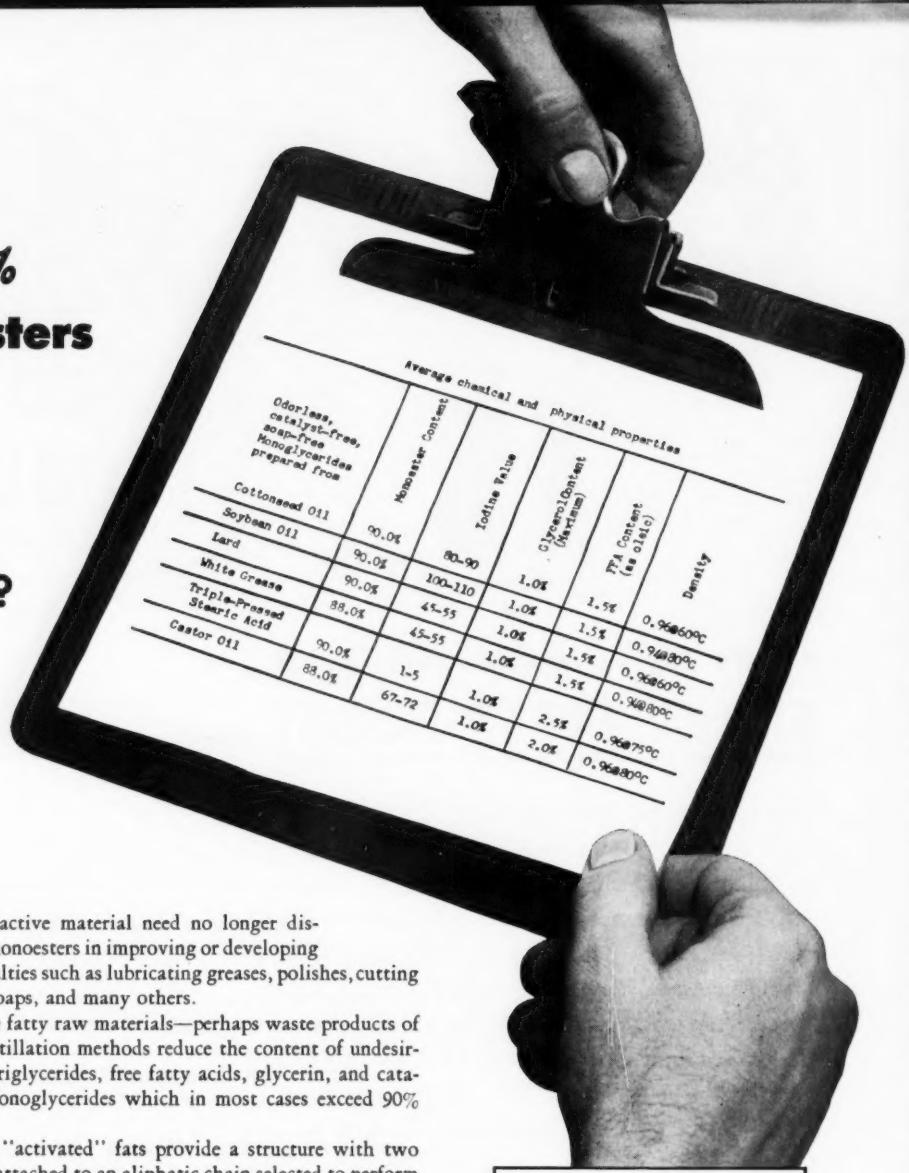
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PRODUCTION . . .



WORKS MANAGER RIDOUT: A design for safety, blueprint for economy.

Continuous Trend

Du Pont and C.I.L. are putting in new plants which will use the Biazzini continuous nitration process.

Big plus for Biazzini is its safety factor since it processes small quantities of explosive.

Expert consensus is that otherwise, the three nitration processes are economically on a par.

Next spring, when Canadian Industries Ltd.'s plant near Calgary, Alberta, goes on stream, the North American continent will have its first continuous nitration process in a commercial explosives plant. The C. I. L. plant which is now nearing completion follows the general pattern of other explosives facilities except in the nitroglycerine section, where a continuous Biazzini* nitration process will be installed.

But though C. I. L. will put in the first such unit, Du Pont will not be far behind: It has been working on the process for several years, has now decided to incorporate it in a new explosives plant to be built in Martinsburg, W. Va. The two installations—plus others that are under security wraps—indicate a solid trend toward continuous nitrations.

Both C. I. L. and Du Pont will use the Biazzini process for nitroglycerine, but it can be easily adapted to other nitrations. Some of the compounds that have been successfully produced:

- Monoethylene glycol nitrate (MEGN) and diethylene glycol nitrate (DEGN).
- Pentaerythritol tetranitrate (PETN).
- Cyclonite.
- Mononitrobenzene, mononitrochlorobenzene and dinitrochlorobenzene.
- Mono-, di-, and trinitrotoluene.
- Mononitronaphthalene.
- Dinitro ortho cresol.

Biggest selling point for the continuous process is the safety factor, since less nitroglycerine is present in the reactor at any given time. A. M. Ridout, recently-appointed works manager for the Calgary plant, for instance, says that in a batch reactor there are about 7,000 lbs. of sensitive nitroglycerine, but only 100 lbs. in a comparable Biazzini nitrator. Furthermore, Ridout points out, with the Biazzini process there are automatic controls which shut off the feed in case of power failure or in case the temperature in the reactor gets too high.

Choice of Three: Continuous nitra-



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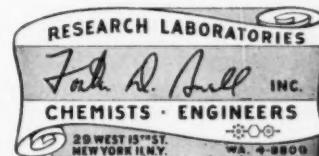
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PRODUCTION . . .

tion has been used extensively in Europe for some time. The first process was the Schmid-Meissner, developed for nitrating glycerine in 1925. In the Schmid process, glycerine and mixed acid continuously react in a large agitated vessel. Nitroglycerine is separated from the spent acid in inclined baffled tanks, then washed and neutralized in tower-type washers.

In this country, the batch process has been used exclusively until recently. In the batch process, one reactant—either acid or organic material—is slowly added to the other. Provided with multiple cooling coils and agitators, batch nitrators are large (500- to 3,000-gal.) vessels.

After nitration, the product is separated from the spent acid in a large tank. Next the product is washed with water and dilute alkali in large tubs that are often agitated by air.

In the Biazzini process, all steps are continuous and automatically controlled. The equipment used throughout is compact and the entire unit can be housed in a small building. A plant for processing 2,500 lbs. of nitroglycerine per hour occupies 500 sq. ft. in a 12 ft. building. The equipment takes up only 90 sq. ft.

The Biazzini nitrator itself is a cylindrical stainless steel vessel with a helical cooling coil and an internal agitator. Instead of passing through intermediate scale tanks as in the batch method, feed enters directly from storage tanks through the cover of the nitrator. Nitrated product and spent acid are continuously withdrawn from the side of the nitrator. Since the reaction rate depends—to a point—on degree of agitation, productivity per unit volume is high. And, correspondingly, time in the reactor is low.

Biazzini separation is carried out in squat, stainless steel tanks. Feed enters tangentially through the side at the layer of emulsion between the separated layers of acid and product. Presumably, rotation of the emulsion layer with reference to the two separated layers agglomerates the tiny droplets, rapidly breaks the emulsion.

Stainless steel tanks—similar in appearance and size to the nitrators—are used for washing. High-speed mechanical agitators (rather than air as in the batch process) effect the mixing. Washing, which is carried out in several vessels connected in series, is said to be efficient and fast.

Biazzini Bargain? Aside from the safety angle, the Biazzini process may have certain other advantages over the batch process. C. I. L.'s Ridout says he expects considerable savings in labor costs. And Biazzini himself has

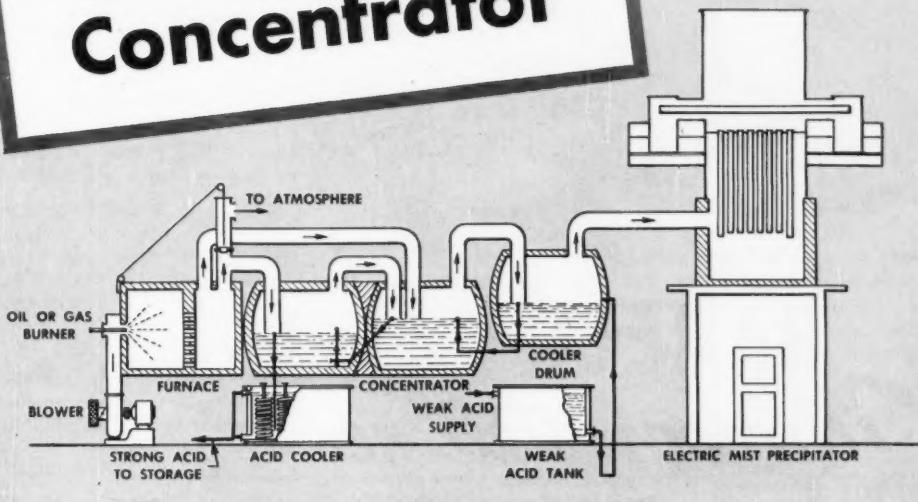
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As the diagram and description of the process show, the major advantage of this Drum-Type System lies in its *complete utilization of direct heat*. This accounts for the high economy of this Chemico method of concentration. The process is continuous. Only one control man is needed per shift, even for multiple units.

Where sulfuric acid contains iron sulfate, Chemico offers the High-Temperature Concentrator. The Flash-Film Concentrator may be used efficiently where low cost steam is available for heat, or if acid quantities are small or intermittent. Whatever your sulfuric acid concentration problem, it pays to consult Chemico.

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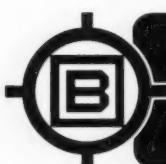
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PRODUCTION . . .

put forth several reasons why his process is more attractive: He says that the smaller plant and faster reaction could mean a more economical operation; and he points out that the smaller nitrator provides relatively more surface area for cooling purposes. That means warmer water or brine can be used to obtain the same degree of cooling.

However, the prevailing opinion among experts is that there is little to choose among the batch, Schmid-Meissner or Biazzì processes. All things being equal, they say, any one of the three processes, if given the same production efficiency and product requirements, could compete with the others.

But the safety factor alone carries economic significance. Explosions in reactors are rare, but when they do happen, they can be disastrous.

Commercial Debut

There is a lot of hydrochloric acid formed as a by-product of substitution chlorinations. And there have been many attempts to utilize it for regenerating chlorine. But Hercules Powder will be the first company to put in a commercial plant: At Brunswick, Ga., it will install a unit to produce a reported 35 tons of chlorine per day.

Hercules' hydrochloric acid will come from its toxaphene (made by chlorinating camphene) plant at Brunswick. If the venture lives up to expectations, it would be a good guess that Hercules will put up another unit at its toxaphene plant in Hattiesburg (Miss.), also possibly at the Henderson, Nev., toxaphene plant that is now abuilding.

Process for the plant will be licensed from Dow Chemical and the Grosvenor Laboratories. The original process—the Grosvenor-Miller^{*}—forms chlorine in two steps. In the first step, hydrogen chloride reacts with ferric oxide (containing potassium chloride to prevent the resultant ferric chloride from volatilizing). In the second step, air comes in contact with the ferric chloride to produce chlorine and regenerate ferric oxide.

Dow proved the commercial feasibility of a variant on the Grosvenor-Miller process in a Pittsburgh, Calif., pilot plant, and it will be the Dow variant that Hercules will install. Covered by a patent,[†] the Dow process uses a moving bed instead of the two-step process.

More Ways Than One: There have been several other methods for get-

* U.S. Patent 2,206,399.

† U.S. Patent 2,577,808.

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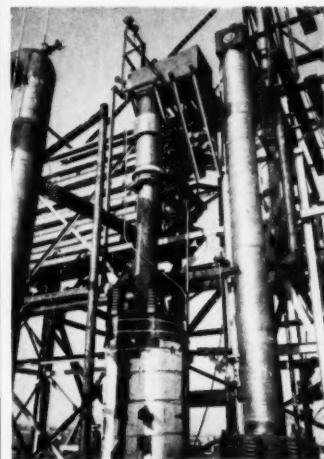
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McGRAW-HILL PUBLICATIONS

PRODUCTION



FROM CHLORINATIONS: Commercial chlorine after many attempts.

ting chlorine from hydrochloric. Air Reduction and Solvay operated a pilot plant for some time, using a new version of the Deacon process—direct oxidation of hydrochloric in the presence of a catalyst. They claimed an improved catalyst. Two leading petroleum companies (Esso Standard and Socony-Vacuum) have patents on processes and a third (Shell) has looked into the possibilities of the idea.

Dow itself had planned a 25-ton-a-day plant, but the company now reports it has abandoned the idea of exploiting the process for its own use, since "it would not fit in with the general pattern of company operations." It does say, however, that several companies are showing interest in the process.

New Sulfur Source

Another attempt, the third within 15 years, will be made in a few months to place large sulfur-bearing ore deposits in Utah on a commercially productive basis. Chemical Corp. of America plans to put into operation in early 1952 at Sulphurdale, on the Beaver-Millard County line in Utah, a \$300,000 pilot plant for the production of elemental sulfur.

Clarence R. King of Santa Ana, Calif., consulting engineer for Chemical Corp., says diamond drilling indicates the presence of 3 million tons of sulfur-bearing conglomerate rock in the district, with the ore running 25% brimstone.

The pilot plant is slated to have an ore capacity of 100 tons per day. Production will go to the several chemical companies who are reportedly backers of Chemical Corp.; a small



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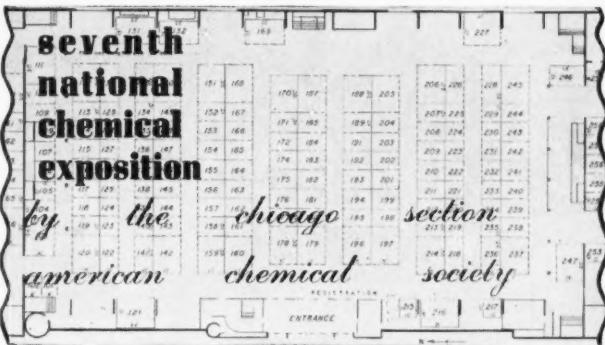


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PRODUCTION

surplus will be sold on the open market by the affiliated Western Sulphur Industries, Inc.

If the pilot plant and open pit mining operations prove economically feasible, a 1,000-ton mill would be erected at Sulphurdale, according to reports. Sulfur-bearing formations occur as outcroppings in the district at about 30 ft. below the surface. Additional diamond drill tests are planned in 1952, with the expectation that reserves exceeding the present 3-million-ton showing will be located.

King says conventional milling processes will be followed in the ore reduction program. However, it is planned to utilize the boulders and coarse rocks making up the conglomerate as grinding elements in the milling of the ore.

In addition to the production of elemental sulfur, consideration may be given to the production of low-grade "soil-sulfur" for agricultural needs.

EQUIPMENT. . . .

Moisture Detector: First demonstration in a plywood mill of an automatic continuous moisture detector was made recently at the Olympia, Wash., plant of the St. Paul & Tacoma Lumber Co. Made by Laucks Laboratories (Seattle) the machine can be set to mark stock, ring a buzzer or activate a kick-off mechanism whenever material appears with excessive moisture. The machine is said to have increased drier efficiency by 10% at the Olympia plant.

Temperature Control: Farris Stacon has added Type 1005 temperature regulator to its line of self-operated controllers. Farris Stacon claims that design efficiency enables quick, easy disassembly which in turn simplifies cleaning and maintenance in the field. Other features claimed by the company: visual finger-tip control, built-in strainers to protect both the main and pilot valves, internal porting to eliminate external damage and minimize maintenance.

Price Cut: Effective the first of the year, M. W. Kellogg has reduced the price of its low- and high-density Kel-F fluoroplastic molding powders by \$1.30 a lb. in ton lots. Low-density powders will now sell for \$11 a lb., the high-density powders for \$12 a lb. Prices for plasticized molding powders will also be reduced by about \$3 per lb., will sell for \$13 per lb. in ton lots. Cost of Kel-F fluoroplastic dispersions, however, will remain at \$15 per lb. of solids content.



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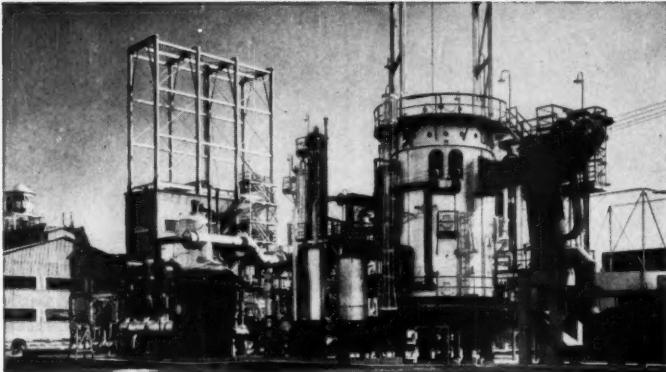
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Life ...on the



SOUTH OF THE BORDER... New ammonia synthesis plant in Mexico represents another engineering achievement of the Chemical Construction Corporation, a Cyanamid subsidiary. Shown in the photo are the ammonia synthesis building, gas reformer and waste heat boiler, typical units of this specially designed installation. This is another example of the engineering skill that goes into fertilizer and heavy chemical plants built by Chemico in every part of the globe.



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of more than 0.005". AEROCASE 510 is also used to help harden the "tailpiece" of the Ingersoll-Rand R-58 Stopshamer and acts as a cover for the lead bath. This three-way use is typical of the versatility of Cyanamid's family of metal treating compounds which includes: AEROCARB® Carburizing Compounds, AEROCASE Case Hardening Compounds and AEROHEAT® Heat Treating Compounds.

Chemical Newsfront

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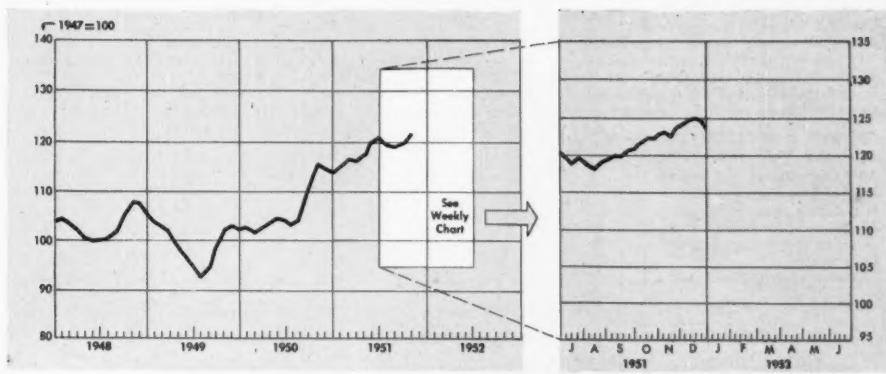
Plants at Neville Island, Pa., and Anaheim, Cal.

Part of Neville's current expansion program is this new plant recently completed at Neville Island, for the production of NEVSOLV Solvents

NEVILLE

Chemicals FOR THE NATION'S INDUSTRIES

M A R K E T S



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

The price differential between fermentation n-butanol and the synthetic product was erased this week. One major producer trimmed the price from 28¢ to around 18¢ a pound (tanks), the second decline in the last six months. Butyl acetate, a close relative, charted a similar price course.

Reason: letup in demand for solvents plus the prospect of cheaper fermentable raw materials, notably molasses. Industrial alcohol's decline the week before was less precipitous because additional butadiene needed in the rubber program provided a cushion.

Some idea of the price squeeze faced by many chemical processing industries is brought out this week in figures put forth by the Paint, Varnish, and Lacquer Assn. Paint makers must pay higher prices for metal pigments, imported drying oils, and other raw materials, but their customers won't pay higher prices for the finished product.

These price indexes tell the story:

	Nov. 1951	Oct. 1951	Nov. 1950
Prepared Paint	154.4	154.2	143.6
Paint Raw Materials	178.4	172.2	156.1

Those who draw up chemical price contracts—and many others who follow chemical price indexes—ought to know that the Bureau of Labor Statistics will use a new base period starting this month. The new standard is based on the 1947-1949 period; the old one, now far outdated, went back to 1926, ignored many now-important chemical products.

To ease the pains of transition, the Bureau will be available to assist in the changeover.

This change has been long overdue. In the case of the chemical industry, for example, few could have foreseen the growth in plastics output from a few million pounds annually to over 2 billion pounds, with the ceiling not yet in sight.

The year 1952 looks like a banner time for the plastics industry. Improvement in supplies of raw materials and expansion of facilities, linked with strong demand, should set new records for output of phenolics, vinyls and polyethylene.

MARKET LETTER

WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	124.2	124.0	116.0
Bituminous Coal Production (Daily average, 1000 tons)	1,825.0	1,571.0	2,005.0
Steel Ingot Production (thousand tons)	2,051.0	2,041.0	1,981.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	137.6	137.7	142.3
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	243.0	246.8	209.7
Chemical Process Industries Construction Awards (Eng. News-Record)	\$53,940,000	\$30,593,000	\$6,246,000

MONTHLY INDICATORS—PRODUCTION

	Latest Month	Preceding Month	Year Ago
All Manufacturing and Mining	218	218	215
Durable Manufactures	275	274	260
Non-durable Manufactures	188	188	195
All Chemical Products	297	299	280
Industrial Chemicals	552	563	497
By-product Coke	177	178	170

Low-pressure molded reinforced plastics are tagged as comers even among other fast-stepping plastics. Nation-wide there are now about thirty companies making these laminates, but none is operating on more than a moderate scale. This situation is ripe for a change: Sales rate by the end of 1952 will nearly triple the rate in 1950.

Vinyls are going to make further headway during 1952, but the growth will probably be less spectacular than in some former years. The industry is just recovering from last year's letdown in vinyl-coated fabrics; now the outlook is brightened by greater needs of the military and by promising developments in structural vinyls. These prospects have induced at least two manufacturers to push ahead with new capacity.

Big expansion plans are afoot for phenol and phenolics, which take some 65-75% of phenol. Supply is at present nearly in balance with demand, thanks to Bakelite's new phenol plant at Marietta, Ohio. But other slated production boosts may fall behind schedule in 1952 from lack of raw materials and equipment. This is likely to lead to moderate shortages during the year, because many consumers are already getting impatient.

As yet, DPA is only in the early stages of revising upward its long-term estimates of U.S. chemical needs. It has already called for substantially more phenol, phthalic anhydride, and fixed nitrogen. Newest (and biggest) supply goal: 8.4 million long tons of free and combined sulfur a year by 1955.

DPA thinks that sulfur requirements by then will exceed those of 1950 by over 40%. Furthermore, to meet the new target, it is ready to help with priorities and fast plant write-offs where needed.

The plan—calling for a 1½ million-ton annual capacity boost—aims to insure a supply 2.3 million tons more than the industry turned out in 1950. To meet the objective, all means will be explored, including a greater use of byproduct sources and cutting back on exports.

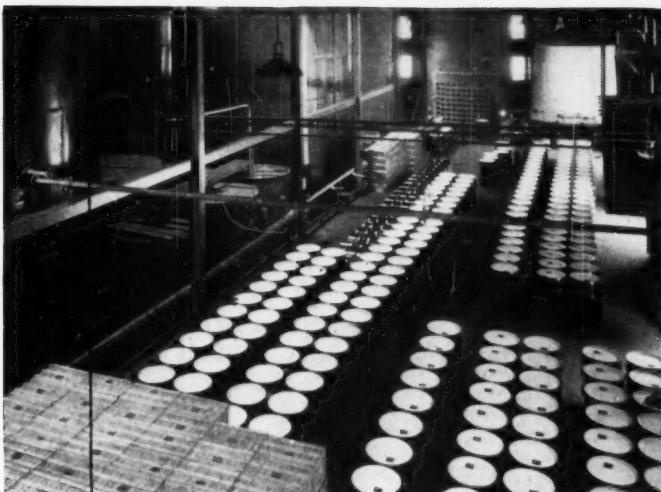
If you have any DDT to sell at export during the current insecticide off-season, now is the time to do it. Reason: good supply, high domestic output. OIT will license a total of 14.7 million pounds until March 1, when U.S. farmers start heavier buying.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending January 14, 1952

UP	Change	New Price	Change	New Price
Tung Oil, imp., tanks	\$.01	\$.40		
<hr/>				
DOWN				
Carnauba Wax, No. 1 yel.	.04	1.17	Phosphorous Oxychloride, cwt.	.35
Muriatic Acid, 18°, tank cars, ton	4.00	25.00	Shellac, lemon No. 1	.01

All prices per lb. unless quantity is stated

M A R K E T S



ALCOHOL STORAGE: Easier supply, a price realignment.

Alcohol Price Gap Narrows

Fermentation alcohol price dips from 90¢ to 75¢ a gallon, approaching synthetic's 55¢ level.

New capacity in 1952 will make synthetic output about triple alcohol production from molasses and grain.

Alcohol imports and lag in rubber program will lessen need for domestic alcohol, and bring further supply improvement.

The price tumble that fermentation-made industrial alcohol took this week was not entirely unexpected in the trade. Stocks have been building up faster than demand, new synthetic output is coming in, and this year there is a bumper crop of Cuban molasses, a major fermentation raw material.

The big question confronting alcohol producers now: What will be the long-term adjustment in price between fermentation and synthetic?

The factors affecting this outlook are too complex and variable to permit an offhand answer. Certainly no sound prediction can be made until the Office of Rubber Reserve can determine its need and goals for butadiene in GR-S.

But this much at least is sure: No one need be concerned about an alcohol shortage for a long time to come. Customers, moreover, can relax; they won't pay higher prices. With the 15¢-a-gallon drop, current prices are 75¢ for the fermentation type and 55¢ for the synthetic. As supply and demand for alcohol come into balance, the differential between

the synthetic and fermentation products will shrink.

Major Now Synthetic: Further narrowing of this gap during 1952 is a virtual certainty. Two synthetic ethanol plants have just gone on stream: Carbide and Carbon Chemicals' plant in West Virginia, and Tennessee Eastman's in east Texas. National Petrochemical is in the process of building one in Illinois; and other companies whose interest is more than casual, are determining whether more plants are needed.

With the new synthetic capacity that will be made available, ethanol will be preponderantly synthetic for the first time in the history of the industry. It is expected that U.S. synthetic output will approximately triple that made via fermentation.

Rubber's Reserve: All this synthetic capacity combined with the amounts potentially available from molasses and grain would be more than ample for domestic demands, except that the synthetic rubber program is supposed to take up the slack. But prospects for alcohol as a source for butadiene are not overly encouraging.

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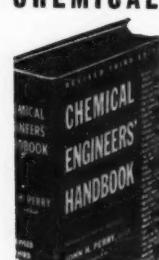


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MARKETS

Despite the fact the the GR-S goal of 860 thousand tons now calls for 220 thousand tons using butadiene from alcohol, this is a matter of production necessity rather than choice. If more petroleum butadiene becomes available, ORR, which drives a shrewd bargain, won't hesitate to use it instead of the higher-cost alcohol butadiene.

ORR is not in as great a rush to buy as some might think. By means of an active buying program abroad during the last year, about 120 million gallons of alcohol were imported. Most of it came from France, with smaller quantities from India, Belgium, and Germany. All of this alcohol bore a price tag below 65¢ a gallon, landed cost with duty paid. At year's end, stocks of alcohol for the rubber program were around 100 million gallons; moderate purchases of domestic alcohol, in addition to the large im-

ports, helped maintain these large reserves.

Domestic Turn: During this year, butadiene from alcohol will take increasing quantities of domestic alcohol output. Capacity target of 860 thousand tons of synthetic rubber won't be reached until fall, will then need 150-175 million gallons of alcohol. About half of this will be U.S.-produced. But when the price-conscious ORR buys, the lowest-cost producers naturally will be in an advantageous position.

PICTURES IN THIS ISSUE:

Cover (top)—Reni Photo; Cover (bottom)—New England Alcohol Co.; p. 13—H. Friedlander; p. 14 (left & right)—Wide World Photos; pp. 16 & 18—Reni Photo; p. 36—Army Medical Dept.; p. 45—Editorial Associates Ltd.; p. 50—Tennessee Products & Chemical Corp.

GOVERNMENT NEEDS

Bid Closing	Invitation No.	Quantity	Item
Commanding Officer, New York Chemical Procurement District, 111 East 16th Street, New York, N.Y.:			

Special chemical items for use in rubber compounding as follows:			
Jan. 21 (CML-EP-070-52-33)	78579 lbs	Stearic acid (triple pressed) agerite, white, or equal.	
	47152 lbs	Symmetrical dibutanaphthalyl, para-phenylene diamine.	
	47152 lbs	Lithopone (29% zinc sulfide 71% barium sulfate).	
	78579 lbs	Mercuriobenzothiazole, "Captax" or equal.	
	78579 lbs	Titanium dioxide (Fed. spec. TT-T-425, Type 1).	

Chief, Procurement Division Supply Service, Veterans Administration, Washington 25, D.C.:

Jan. 21	A-43	570 lbs	Acetic acid glacial
		264 btl	Aminoacetic acid
		432 btl	Potassium phosphate monobasic
		480 btl	Potassium phosphate dibasic
		1900 dr	Soap medicinal soft

Chief, Procurement Division Supply Service, Veterans Administration, Washington 25, D.C.:

Jan. 23	52-211-B	1,330 rolls	Barrier material, greaseproof and waterproof
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Business Service Center, Region 3, GSA, 7th & D Streets, Washington 25, D.C.:

Jan. 24	2W-6217-R	145,000 lbs	Trisodium phosphate
	2W-6218-R	1,050 each	Charges, fire extinguisher

GOVERNMENT AWARDS

Item	Supplier	Location
Corps of Engineers, U.S. Army, Chicago Procurement Office, 226, West Jackson Blvd., Chicago:		

Potash	Agricultural & Industrial Potash Development Corp.	Harrisburg, Penna.
Superphosphate	Simplot Fertilizer Co.	Pocatello, Idaho.
"	Stauffer Chemical Co.	San Francisco, Calif.

U.S. Navy, Aviation Supply Office, 700 Robbins Avenue, Philadelphia 11, Penna.:

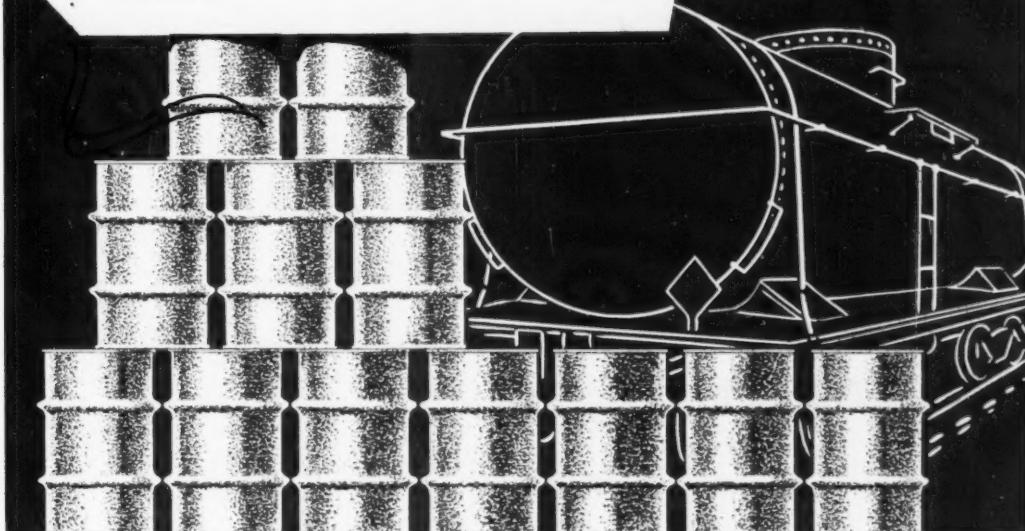
Anti-icing fluid	Shell Chemical Corp.	New York, N.Y.
Enamel, exterior	The Sherwin-Williams Co.	Philadelphia 7, Pa.
Alcohol, specially denatured ethyl	Iac Chemical, Inc.	Culver City, Calif.
Alcohol, specially denatured	Pulicker Industries, Inc.	Philadelphia 2, Pa.

Navy Purchasing Office, New York, N.Y.:

Soap powder, strongly alkaline cleaner	Spazier Soap & Chem. Co.	Santa Monica, Calif.
Soap powder, strongly alkaline cleaner	Kamen Soap Products Co., Inc.	New York, N.Y.
Trichlorethylene, vapor-degreasing	Niagara Alkali Co.	New York, N.Y.

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Dryer; Squier Stainless Rotary Atmospheric; 26' by 20', First Machinery Corp. 157 Hudson St., N.Y. 13, N.Y.

Dryer, Vacuum Shelf Dryer, MD Pumps, 3 HP motor. Eagle Indus. 110 Washington St., NYC.

Dryer, Vacuum shelf, Devine, double door, 17 shelves, pump, condenser. Consolidated Products, 18 Park Row, N.Y. 38. BARclay 7-0600.

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Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

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For more data, circle number on coupon.

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Acrylics	36A
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TECHNICAL LITERATURE

CHEMICALS	
Essential Oils, Aromatic Chemicals, etc.	64B
2,5-Dimethyl Piperazine	64A

EQUIPMENT	
Cooling Coils	64D
Laboratory Gases and Equipment	64C
Liquid Filling Machines	64E
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Process Machinery	64G
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Air classifying systems, bulletin 17-B-36	2b
Ammonia synthesis plant	54-55c
Aprons, utility, vinyl	T59c
Chemicals	
Acrylic emulsions	1d
Acrylic solutions	1e
Alcohol ester, AE-1	22-23c
Aluminum chloride solution	65
Benthalmaleic anhydride	22-23e

Benzyl chloride	22-23b	Ricinoleates, metallic	5
Bottling industry	T20	Rubber accelerators, Calco NOBS No. 1	54-55b
Casings	54-55d	Sodium metasilicate	T50
Cationic bactericide & deodorant, concentrated, Onyx B.T.C.	30	Sodium phosphates	41
Detergents, synthetic		Sodium polyacrylate	1b
Sulframin AB-Concentrate, flakes or powder	10-11b	Solvents & solvent oils	35
Sulframin AB-40, flakes or powder	10-11a	Solvents, aromatic petroleum	56
Detergent & wetting agent, Santomerse No. 1	22-23d	Solvents, coal-tar	51
Di-second-ary-amylphenol	61	Styrene-butadiene latices	1c
Distearates	31a	Toluene-sulfonic acid	22-23a
Electronic tube, tonnage	24	Trichlorobenzene, kolker	21
Emulsifiers, bulletin P-142	22-23h	Vinyl copolymer emulsions	1f
Ethyl glycol	33	White oils	B42c
Fatty acids		Chemical Exposition, 7th National	52
Distilled	T42	Chemical service	
Rancidity-resistant	43	Research laboratories	T45
Formaldehyde	17	Research & technical service laboratory	66
Glycerine, U.S.P.	53	Clarifiers, bulletin 31-D-36	2d
Ion-sequesterating agents, organic	38	Classifiers, wet, bulletin 39-B-41	2e
Industrial		Concentrators, sulfuric acid, drum type	47
Butyls	12	Containers,	
Plasticizers	26	Bags, paper, multiwall	4
Ketones	B45	Polyethylene bags & liners	T59a
Lithium compounds	B32	Shipping sacks, multiwall paper	25
Magnesium oxide	54-55e	Covers, barrel or drum, vinyl	T59b
Manure salts	B20c	Feeders, constant weight, bulletin 33-D-36	2g
Metal Treating compounds	54-55a	Heat exchangers, evaporative and quench bath cooler	34
Mildew preventer, Milmer 1	22-23f	Heating units, electric	18
Monoesters	44	Materials of Construction, ferro-alloys	26a
Mono stearates	31b	Mica, glass bonded, mycalex	27b
Muriate of potash, granular	B20b	Mills, ball, pebble & rod	2a
Muriate of potash, Higrade	B20a	Pumps, polyethylene	T32
Petrochemicals	I	Refractories, catalyst supports	6
Petrolatums	B42b	Separators, heavy media, bulletin 39-B-41	2f
Petroleum sulfonates	B42a	Speed reducers, vertical, bulletin 125	9
Plasticizers		Sulphur	49
HB-40	22-23g	Surfacing plastic, for desk tops	27c
Mps-500, bulletin 35	19	Tank storage terminals	3
PX	37	Testing sieve shaker, "end-shak"	46
Polycrylic acid	1g	Thickeners, bulletin 31-D-36	2c
Polystyrene latices	1i	Vacuum processing equipment, pumps, microvac	29
Polyvinyl acetate emulsions	1a	Waxes, microcrystalline	48
Polyvinyl acetate solutions	1b		
Reducing agents			
Sodium borohydride	36		
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34A	52A	64A	64C	64E	64G
36A	52B	64B	64D	64F	64H
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I	1h	2g	12	22-23c	26a
1a	1i	3	17	22-23d	26b
1b	2a	4	18	22-23e	27a
1c	2b	5	19	22-23f	27b
1d	2c	6	T20	22-23g	27c
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BOOKLETS

Chemicals

2,5-Dimethyl Piperazine

Technical bulletin giving information on 2,5-dimethyl piperazine, an alicyclic di-secondary amine, and indicating its potential use as an intermediate in the synthesis of pharmaceuticals, resins, rubber anti-oxidants and activators, textile-finishing agents, and boiler treating compounds. Carbide and Carbon Chemicals Co.

Essential Oils, Aromatic Chemicals, etc.

12-p. wholesale price list covering essential oils, sesquiterpeneless and terpenefree oils, citrus concentrates, floral absolutes, floral concretes, aromatic chemicals, fixatives—both animal and resinoid—, tinctures, oleoresins and others. Fritzsche Brothers, Inc.

Equipment

Laboratory Gases and Equipment

24-p. illustrated catalog giving information on the specifications, construction and prices of such equipment as pressure regulators, needle valves, gas proportioners, humidifiers, and autoclaves as well as supplying data on laboratory gases. A detailed chart outlines basic properties and principal impurities of gases as shown by typical analyses. Other sections present recommended safety precautions, the firm's "color coding," standardized valve data, and revised cylinder terms. Ohio Chemical and Surgical Equipment Co.

Filter Presses

32-p. brochure discussing filter presses, filter media and accessories in regard to design, construction, operation, materials of construction, industrial applications, typical installations, and specifications. An introductory section explains the nature of the filter press, its advantages, capacity required and the purpose of the filtering operation, as well as recommendations for selecting filter presses. T. Shriver & Co., Inc.

Cooling Coils

72-p. bulletin reviewing developments in extended surface cooling coils, for use with direct expansion refrigerants and chilled water in air conditioning or process applications, with special note made of coils designed for such industrial applications as gas cooling, butane vaporizing, transformer oil cooling, etc. The major section of the publication supplies data necessary to the engineer in selecting the proper design for any specific air conditioning, industrial or process application. The Trane Co.

Liquid Filling Machines

12-p. 1952 catalog describing and illustrating various types and models of the firm's line of straightline fillers, vacuum fillers, gravity fillers, junior vacuum fillers, and the bench model liquid filler,

with reference to operation, advantages, dimensions, speeds and main application details. Packer Machinery Corp.

*Tubing Failures

40-p. illustrated booklet entitled, "Some Experiences in Service," by John J. B. Rutherford, reports the results of investigations of tubing failures in boilers, cracking stills, heaters and heat exchangers during service at elevated temperatures and pressures in the power, oil and chemical processing fields. Carbon steel, intermediate chromium-molybdenum alloy steel and stainless steel tubing were considered in this study. The Babcock & Wilcox Tube Co.

Material Pumps

Catalog covering 22 models of "Tornado" material pumps, units constituting a combination of two air motors and five pump tubes, and capable of handling such materials as underbody coatings, roofing materials, putty, caulking sealers, adhesives and food products in varying consistencies. Stewart-Warner Corp.

Process Machinery

8-p. bulletin reviewing its line of process machinery for mining, chemical, stone, ceramics, mineral, paper, water, industrial wastes, and sewage applications. The bulletin is divided into sections by actual process operations such as agitation-mixing, calcining, classifying-separating, conveying, cooling, digesting, drying, flocculating, etc. Hardinge Co., Inc.

Tabletting Presses

Catalog pictures and briefly describes 23 of firm's tabletting presses—single-punch and rotary, mechanical and hydraulic—used for pharmaceutical, powder metal and plastic preform production. An added section deals with punches and dies. F. J. Stokes Machine Co.

* Request must be made directly to the company on business letterhead.

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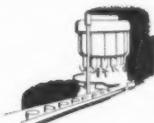
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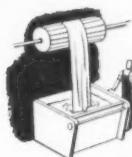
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